A 9.9 Media
Publication

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**SPACE
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**HOW TO BE A
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STAR**

DISCOVER
**COMPUTATIONAL
CREATIVITY**

U MAD BRO?

TO TROLL, OR NOT TO TROLL,
THAT IS THE QUESTION

Tips & Tricks: Facebook privacy, Remember everything, and more | **Agent 001:** Thunderbolt 3

Blind Faith

This month I'd like to talk about science: the great fiery crucible in which the engines of invention are forged; the true birthplace of technology and all that is good; the real reason why you are about to read this magazine under the bright light of an incandescent bulb, amongst other "miracles".

The reason I want to talk about science is thanks to a rather silly video that's been doing the rounds on Facebook lately. It's an old video by a well known evangelist who goes by the name of Ray Comfort. Like all bad ideas, the video keeps re-surfacing from time to time and is an attempt to disparage science and scientific thought. The video features Ray going around a US campus (presumably UCLA) interviewing students and professors alike, asking them if they "believe" in evolution. The video adds an unhelpful and cherry picked definition of evolution too at the beginning, which is attributed to LiveScience: Evolution can turn dinosaurs into birds, apes into humans, and amphibious mammals into whales.

The interviewees – almost all of them biology majors, PhDs, physicists and biochemists – are then cornered into presenting "observable evidence that can stand as proof of evolution". This is where the video gets interesting. The respondents to this sneak attack, experience a visible deer-in-the-headlights moment. Eventually, when they recover and talk of the fossil record and evolution over "millions of years" he quickly jumps at the time period stating "so that means it can't be observed".

When the respondents talk of the beaks of Galapagos finches changing to suit conditions of specific islands they evolved on, our friend asks the interviewees to give evidence of "change of kind" not minor adaptations. Ray presumably wants photographic evidence of the precise moment when say a slug like creature developed a vertebra or when a primordial vertebrate became a dog. Maybe even photographic evidence won't do. Maybe he wants to see it happen in front of his eyes. That's like observing a tree for a nanosecond, not perceiving any growth and saying trees don't age at all. While everyone knows that some trees like the mighty sequoias grow to great heights over a thousand years in some cases.

A few brilliant tricks of editing later when his respondents are seen dumbfounded (who wouldn't be?) finally telling him that they can't present "observable" evidence of the kind he expects, he asks his victims another question: "Do you know what belief in something without evidence is known as?" No Mr. Guy With Camera, what is it known as? "Blind faith," he says emphatically. You can watch the video here if you wish: http://dgit.in/BlndFth

Now as I sit here in the comfort of a chair I can say things like "if I was being interviewed I'd show him". But one look at Indian news channels and we all know what the effects of being in front of a camera, badgered by a confident inquisitor can do to the best of orators. I'm no orator but I can certainly try to break down his argument piece by piece on paper. My first response is that this person should really try to not discount the effects of time. We tend to think in terms of our own measly lifetimes but the processes that shape things around us are far far far more lengthy. It's hubris to give our own life spans so much importance. The second has to do with the fossil record. Undoubtedly, even if I were to take this gentleman to a museum of natural history, he'd want rocks to literally depict "change of kind" not minor adaptations. These breakages in the record are what are known as missing links. Science may not have all the answers, but it's at least trying to search for them.

Besides, any person with even a remote interest in dinosaurs would be able to tell you that the creation of a fossil needs a very special set of conditions to be fulfilled. It's so rare an occurrence that we're lucky to even have as many fossils as we do today.

So yes the fossil record is evidence. Genetics is evidence. It's too bad it doesn't constitute as evidence to you Mr. Ray, but it doesn't discount science or scientific thought in any way. If we insist on only personally observable evidence to constitute as proof of something only astronauts should "believe" that the earth is round

Siddharth Parwatay
Managing Editor
siddharth.parwatay@digit.in

"If we insist on only personally observable evidence to constitute as proof of something, only astronauts should *believe* that the earth is round"

right? No one else on earth has actually seen evidence for it being round.

I'd like to conclude by saying that there is something that lies between the two extremes of blind faith on one side and personally observable evidence on the other – and that is logic. If an idea is logical, by extrapolation you can arrive at astounding results. The concept of gravitational waves was a logical idea, Mendeleev's periodic table predicted the existence of elements that weren't discovered yet. Evolution, which has been called "the single best idea that anyone has ever had" is exactly such a concept.

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Finding joy in little things

Jayesh Shinde
Technical Editor –
Test Centre
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"The biggest challenge in doing something that we like over and over again is to not let it devolve into a chore."

Let me know your thoughts on this column at: *facebook.com/jayesh.shinde | @jshinde | jayesh@digit.in*

This past month was a bit of an odd one for me. I went back to gaming on a PC, as I used to before my gaming console days. I started playing Counter Strike Global Offensive on the PC. Something that I wouldn't have considered even a few months ago, fixated as I have been on my PS4 games library since Dec 2014. All the Digit folk here in the Mumbai office at least are die-hard PC gamers and it was fun to partake in their gaming sessions after a long, long time. I was no stranger to Counter Strike, having played it in my college days at cyber cafes and briefly when I had newly joined Digit back in 2011. Getting back to the game in full swing last month, I had plenty of fun battling the likes of Siddharth, Abhijit, Mithun and Nikhil, whenever we played locally, or took on complete strangers in the heat of multiplayer matches. Even a few Digit readers who follow me on Steam noticed my renewed activity and played a few matches with me. All of a sudden, gaming became a whole lot of fun – an aspect that was missing from my life in general over the past few months.

At home, observing my two-year-old daughter's increasing appetite for all things tech has given me a sense of learning, far more than just pride and joy. Little things like discovering letters from the English alphabet printed in her pre-kindergarten books on our home desktop PC's keyboard and my laptop made her jaw drop and eyes light up in awe. Suddenly from merely memorizing and visualizing the letters on printed pages or plastic blocks, she could now press down little keys and have the letters magically appear in front of her screen was a big revelation, something that gave her new ideas as to what more she can do with her A, B and Cs.

Last month, I also happened to reconnect with a whole string of relatives whom I'd not met in decades. Hailing from our native village, they were relatively less accustomed to technological marvels that have become a daily part of our lives here in the city. Things like ordering diapers from Amazon, booking a Meru cab for an urgent journey in the middle of the night, and booking tickets to the nearest cinema hall – all from the comfort of your phone was nothing short of magical to their rustic way of life. Heck, one of my elder relatives, who had never before seen a touchscreen smartphone, took to it like a fish to water. He stayed with us for a little over a week, and within that time he had managed to not only master more than just the basics of how to operate an Android smartphone but he even went on to purchase a brand new one he liked (online, of course) to use as his primary phone back in the village. His reactions and sense of wonder was similar to my daughter's when she figured out typing letters.

The biggest challenge in doing something that we like over and over again is to not let it devolve into a chore. The minute this happens, it instantly starts diminishing your sense of fun and excitement levels. We shouldn't let technology and our appreciation of the role it plays in our lives reduce to a mundane occurrence.

That's what I was experiencing with my gaming sessions, especially – and no, I'm not blaming it all on deteriorating levels of games in general. I was as much to blame. For a number of reasons, treating every game as a fun activity with no overheads (like a timely review or analysis for SKOAR) was becoming a tad difficult. However, I only had to shift platforms to reinvigorate the once steady flame of juvenile excitement and unbridled joy every time I started a new gaming session on my PC. It was an awesome feeling. I can't wait to sit through my first whole session of VR gaming, which I expect it to happen sometime within this year itself. That will really send my head into a tizzy!

How do you find joy in little things and how does technology help you in your quest? Drop me a line.

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TRIED & TESTED

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68 MPOW SWIFT
Value for money wireless in-ears

74 GIGABYTE GA-Z170X-UD5 TH
World's first Thunderbolt 3 motherboard

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Step 1
Download the Blippar app

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Step 2
Keep an eye out for the Blippar icon next to some images

3 BLIPP... IMAGE JUMPS TO LIFE!
Step 3
Blip the image and get access to video reviews, interactive games, and much more!

INTERNET SAFETY TOOLS

digit
DVD

TAILS OS 2.2
MWC KEYNOTE

ON THE DVD

MWC 2016 Keynote
The Mobile World Congress yet again witnessed the launch of several flagship phones and devices at Barcelona, Spain. Among the popular products, Huawei launched the Matebook going against the iPad Pro and Surface Pro 4, LG launched their flagship G5 smartphone, a VR headset and a 360-degree camera.
- Huawei
- LG
- Samsung
- Sony Mobile

Internet Safety Tools
- AdwCleaner
- AxCrypt
- Comodo Internet Security
- Epic Browser
- GlassWire
- Ice Dragon Browser
- KeyScrambler Personal
- LastPass Image
- Malwarebytes
- Tor Browser
- Tunnelbear

Games
- Cobalt Demo
- Downfall Demo
- Inside: Before Birth Demo
- Party Jousting
- Shakes and Fidget
- Victory: The age of Racing
- Void 21 Demo

Tails OS 2.2
The Amnesic Incognito Live System (Tails) is a Debian-based live CD/USB with the goal of providing complete Internet anonymity for the user. The product ships with several Internet applications, including web browser, IRC client, mail client and instant messenger, all pre-configured with security in mind and with all traffic anonymised. To achieve this, Incognito uses the Tor network to make Internet traffic very hard to trace.

Crash Course Videos
- Grammar 101

MIT Courseware
In this lecture, Alan Guth summarised the standard Big Bang, cosmic inflation, evidence for inflation, inflation and multiverse, nightmare of dark energy. He also talked about the landscape and environmental selection, anthropic arguments, anthropic explanation, etc.
- Is our universe part of a multiuniverse?

Updates
- JAVA Runtime Environment
- NVIDIA Graphics Drivers
- Uplay
- VirtualBox

MOBILE
MWC 2016 Keynote
• Huawei • Samsung • Sony Mobile

Internet Safety Tools
• AxCrypt
• Comodo Internet Security
• TunnelBear and more...
Tor

GAMES
• Cobalt Demo
• Shakes and Fidget
• Victory: The Age of Racing
and many more...

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APRIL 2016
DVD DUAL LAYER

Crash Course Videos
Grammar 101

COBALT

MIT OCW MIT Opencourseware
Is our universe part of a multiverse?

Tails TAILS OS 2.2

AWAKENING

Arise my brother trolls. Our moment in time is here. No longer are we to be ignored. For millennia the order of the troll has waited, patiently testing the waters, always being hounded, always the minority, always weak, forever hiding. Now finally we can emerge from under the bridges we were banished to, and reclaim what is rightfully ours.

Finally, our saviour has come. Technology was able to connect us, convey our message to a much wider audience, and also allow us to remain anonymous. However, the monopoly of social media on the world has finally given us all the tools we need in order to make a difference in the world. We now have a chance to affect more areas of life than ever before. We should continue the multi-pronged attack on society, because we need to keep the very definition of troll fuzzy. By continuing to show ourselves as deliberately stupid, or funny, or obtuse, we can hide our real agenda.

There was too much order, too much agreement, too much consensus for our liking. We need disharmony in order to grow, chaos in order to thrive. Amidst all of the trolling for fun, we need to start dividing, we need to stoke a few fires, fan a few flames, get the world arguing again. Not only is this fun and gives meaning to our very existence, it also helps evolve the species, as people of differing viewpoints are forced to encounter one another, forced into arguments, forced to settle scores.

We've already achieved a lot, especially in terms of poking fun at religions and all sorts of belief systems that the world holds dear, but also made society question some of the pillars on which it is built. Not only have we fanned the flames between the religious and the scientific minded, we've also lit fires between the two genders.

However, we need to do more; much more. The obsession with social media has helped us get a foothold into what was previously a big corporation dominion... the news was something people usually got from reputable sources. Now we get it from a hundred sources, all in seconds, and all of it through what people share on social platforms. This system is ripe for us to exploit. Whilst the world continues to look at our troll mission as pointless, or a desperate cry for attention, or just entertainment, we are free to dress ourselves in the new outfits that society has thrown together itself. Dressed in the garb of the concerned citizens, and equally distributing ourselves across all possible sides, we can influence society by deepening the rift between sections.

The biggest tool that will help us to do so is virality. People are already only seeking a pre-digested biased viewpoint, because they seek solace and comfort in the familiar. We shall give them that, which they will then spread as their own views, and develop more and more "friends" who agree, and losing touch with all those who don't. This creates the divide we so desire, and allows us to thrive in the cracks.

We have a secret weapon. No matter what the truth, we can bend the only form of information that the majority accept now – videos – to push our pre-defined agenda. Video editing is the most powerful weapon we've ever possessed. We can use the same video of politicians speaking to make them look stupid or smart, doctor videos to make someone look like a patriot or a seditionist, and we do so from ever changing sources so as to make it all seem more believable.

Already the contact that individuals have with others online is homogenised into being contact with like-minded individuals, and we shall continue to ensure this trend continues. Once we have divided the whole world into polarised groups, we can sit back and watch them burn it down for us.

Already the home of technology is so polarised that they're probably going to elect a man who would never otherwise be elected. He will have the power to affect the economy of the entire world, and he will surely use his arrogance and biases to do so.

We will have our time at last brothers. We will triumph. We will stand amidst the ruins like the inspirational Nero, watching the world burn while we laugh maniacally. The new world dawns, arise brother trolls, slumber no more. **d**

AMIDST ALL OF THE TROLLING FOR FUN, WE NEED TO START DIVIDING, WE NEED TO STOKE A FEW FIRES, FAN A FEW FLAMES, GET THE WORLD ARGUING AGAIN.

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Disclaimer
For every Digit contest, there will be only one winner, unless specified otherwise.
In the event of a dispute, the Editor's decision shall be final.

PRODUCTS REVIEWED THIS MONTH

Bazaar

Microsoft Surface Pro 4

Xiaomi Redmi Note 3

LeEco Le Max

Samsung Galaxy S7 Edge

HP Pavilion x360 13-inch

MSI GE62 6QD Apache Pro

Lenovo Yoga 900

Corsair SPEC Alpha

Gigabyte Z170 UD5

WD Cloud

Brainwavz Omega

MPOW Swift

iFrogs wireless IEMs

DJI Osmo

Titan Juxt

Comparison Test - Smart Watches

Apple Watch

Moto 360 2

Samsung Gear S2

Asus ZenWatch

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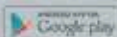
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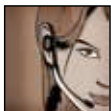
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16

All the latest lifestyle technology, gadgets to drool over and gizmo porn like never before. Desire, Greed and Temptation ahead...

Smart plastic

Be ready for screen that repairs itself. Self healing plastic is here!
http://dgit.in/SelfHlPl

✉ Gotta say, you're doing some fantastic work ! I can't stop admiring all that you do.

But that's not what I am writing this letter for. In March's SKOAR! issue, the .apk for the Kuvah story is not available. The given link is not working. Also, I couldn't gain anything useful by blipping it. So, if you could, just send me the apk, or fix the link. I really want to try out Arnab's game..

–Emil Titus

🅳 You are right, the link wasn't working. We've fixed it. Try it again: http://dgit.in/bbyGmE7d

Thanks for the heads up.

–Siddharth

✉ I would like you to inform that while searching for some budget laptops on your website that the text of most reviews don't match the laptop name in your top 10 list.

It is an unexpected error from a technology magazine like you.

Kindly resolve this issue.

–Umashankar Sharma

🅳 Hi Umashankar,
We apologise for the incorrect descriptions for our best budget laptop suggestions. There seems to be a database issue (which we weren't aware of). Descriptions from our previous laptop recommendations seem to have overwritten the current ones. We are looking into it and rectifying the list on priority.

–Soham Raninga

✉ What's upppppppppppp guys! I'm Aryaman and I live in Kullu.First of all, I would like to appreciate the awesome work you guys do. Honestly speaking Stuff Magazine was another favourite of mine but due to its cover page I was forced not to buy it, or my parents would surely kill me. Hence Digit is my best buddy. Stuff did its reviewing very effectively but you know they are good but not the best. Digit is the best in almost every aspect. I have been reading Digit since I was 14 (now I'm 16). Back then I was only interested in the DVDs, but now I enjoy all of its content.

The posters you provide with SKOAR! add another star to the glory of Digit. I loved the poster you provided with the anniversary edition – the one with lots of quotes

Feedback for the March 2016 issue of Digit

by mighty digitians. By including dmystify you have given us the unexpected!

I really enjoy The Static Page, Big Bytes and also the RSS Feed but the best according to me is the Big Bytes and The Static Page. Here's my first request: could you do the same thing for SKOAR! I know you guys are very busy but still. I really do not expect an article from Big Daddy because he writes for the main mag as well but still I am sure you can get it done.

I particularly enjoy SKOAR! because I am a gamer, a "Console Gamer" and I am proud of it. I was the first person among my friends to play and finish GTA V! Doesn't sound cool now, but it really did back in 2013.

Few questions:
1. Siddharth Bahia what is the reason for your faint smile. Is it natural or are you married?
2. What can we expect from iPhone 7?
3. Do you like YouTubers like MKBHD or Unbox therapy or Tech Source or the God of YouTube "PewDiePie", if no, do check them out.

Some requests:
1. Change the DVD UI already
2. Can you send us the latest gameplay of some newly launched games every

month? At least five to ten! No negotiations!
3. Will you wish me luck for my biology exam tomorrow?
4. If by any chance you are going to include wallpaper in the next issue's DVD could you include some by Justin Maller.
5. Previously, in some issue of SKOAR! you gave a timeline and it was great! Idea of some great genius, I'm sure. Could you provide one in the form of a poster?
6. Please increase the length of you game reviews. Readers want MOAR!

–Aryaman Upadhyay

🅳 Thanks for writing in Aryaman. Great idea about the timeline poster. We'll start work on it right away! I'll also try and persuade the Big Daddy to write a column for SKOAR! So stay tuned for that as well. We like Justin Maller's artwork too. We'll write to him and see if he's willing to share his creations on our DVD.

Yes the smile / scowl probably has something to do with being unmarried.

Best of luck for your biology exam. Hope it went well.

–Siddharth

✉ I am a class 10 student. Though I am supposed to prepare for JEE, I have a pas-

275 million phones
New Android vunerability has resulted in 275 million phones getting hijacked by attackers.
http://dgit.in/275million

Corrigendum
"We apologize to our readers for mistakenly referring to iBall as Intex in the snippet published on Page 47 in last month's issue. We'll be more careful in the future."

Inbox

sion for computers and informatics and computing. My next goal is international informatics olympiad. I have figured out I need to learn algorithms and logic along with cpp. I have some really good books on these topics but can't figure out where I need to begin. They slightly more advanced than I thought. Please suggest some ways to get good at algorithms and programming given my experience. I know the basics of cpp, vb, basic, html, python and computer hardware.

–Surabhit

Hey Surabhit,
First of all, you seem to be way ahead of the curve.

If you want to get better at Algorithms, you can check out MIT's OpenCourseware Videos which are pretty good and since they are in video format, it's easier to understand. (http://dgit.in/mitprog). Course 6.006 deals with basic algorithms.

If you don't get any concept, don't worry, once you start grasping certain elements of the concept, you can start reading the books you have and you'll begin understanding the other elements that are part of the concept. Also, practise as much as you can. Here are a few sites to check out: http://dgit.in/LrnCdng.

We wish you the best and please do write in if you have any further doubts.

–Mithun

I am in a dilemma and you guys are the only ones who can help me. I was thinking of making a project on RFID but I am confused whether I should opt for Raspberry Pi, Arduino or some other micro-controller. Help me to decide or at least give me some links that would help.

–Vasu Gupta

Hey Vasu,
Could you give us more details regarding this project that you're working on?

Arduino has a much shallower learning curve compared to Raspberry Pi so it'll be easier to learn and troubleshoot projects on the platform. Moreover, it is also more economical and there are a lot more compatible Arduino shields that are available in India.

–Mithun

LETTER OF THE MONTH

The last 3 editions of Digit this year have been pretty awesome. The cover stories – Disruption, Angel/Demon, Kanjoos Tech – are so well written and greatly conceived. Was so much fun going through them. I couldn't have said the same thing at this time last year. My favorite is the Jan edition.

Just wanted you guys to know about a thing that happened at my office. As I was going through the Feb issue in my spare time, some colleagues popped in by and inquired about the magazine and went through it at a glance. They said cover story was inspired from Dan Brown's Angel & Demon and it was well illustrated but then Rs 320 (IC Rs.1 = NC Rs.1.6) is pretty expensive. I just replied to them that "5 min for Rs. 320 is pretty expensive sir, but if you go through the articles and then the supplements that it comes with, you'll know you have a treasure trove of technology at hand. And by the way where did you think I garnered this knowledge of gadgets? Show me a mobile phone and I can tell you the specs like the palm of my hand." One thing led to another and I even suggested one of them (upon being inquired for a great value for money smartphone) to get a Nexus 5X (costs Rs. 40000 16 GB, Rs. 25000 IC) and went so far as to tell them to save Rs. 11 each day if spending 320 at a time seems expensive for Digit. Not sure if they were sold on the idea but they stopped arguing .

P.S. I'm a big fan of Robert. If all his articles till now (editorial, tech. review, cover stories) is compiled into a single book , I'll be the first one to buy regardless of the price. If that book comes with the anniversary edition this year that'll be gold. The book would be akin to a research topic for technological evolution of the decade. Well, at least for me anyway. Lord bless you.

–Bhaskar Joshi

You WIN
A Digit T-Shirt

Hi Bhaskar,
Thanks for the feedback. Yes, we're trying something new with our cover stories, and you can expect even more new stuff soon.

I am now a big fan of you. Thank you for defending Digit exactly as I would have – that was an excellent use of logic and simple math to end a silly argument. Well done. I also hope they learnt something from you.

Keep in touch, we'd love to hear more detailed feedback from you.

–Robert

I have been buying your mag for the last four months. Surprised to see the Anime and Manga article. I think most of the college students in india watch Anime or read manga. I think you should issue separate booklet like SKOAR! to cover this topic and give Anime posters too!

Many will love it!

–Vicky

We got quite a lot of positive feedback for that Anime article. The writer – Ashish Panigrahi– is positively beaming. We had no idea Anime is so popular with our audience. Good to know. We'll consider the poster idea too.

–Siddharth

Hello Sid,
You would be really glad to know that your Fast Track, Volume 10, Issue 04, has really inspired me to get started with the Raspberry Pi. I have been working diligently to get a Raspberry Pi community initiated in my College. So far we have around 90% of our 1st year batch except Civil and Architecture enrolled. Around 20-30 professors and the Dean is willing to support us in our cause! The problem is no one in 1st year has knowledge of Linux or Python. So, I was hoping if you would be willing to help us out in our endeavour! Hope to hear from you soon.

–Soumyajit Banik

Hey Soumyajit,
For starters have a look at this article on our website: http://dgit.in/proglang1

It features starter guides for almost every language out there. In addition to this you might remember the August 2015 FastTrack on Building Your Own Custom CMS Using Django. You'll find it's PDF on the December DVD. You'll also find some other FTs on the DVD that'll help you in your endeavour such as:

• Rediscovering Linux (Oct 2014)
• FT to Linux Administration (July 2010)
• FT to Linux Beginners Guide (Feb 2009)
• FT to Linux (April 2006)

In addition here are some useful video courses:

• https://developers.google.com/edu/python/
• https://www.codecademy.com/learn/python
• http://dgit.in/mitintrprog

–Siddharth

Jay here again! Before anything else, I wanna say thanks for selecting my letter as "letter of the month" for February. I'm flattered, shocked and excited all at once! Was really hoping for a distro, but didn't find one this time. But other cool stuff in the DVD made up for it like the game trailers especially Inversus. A classic-like game rarely releases in this "realism-graphics-hunger" era. I personally had mail chats with the maker of the game, Ryan Juckett, asked him a few questions about the game. Too bad there won't be a demo for it (he said so himself). Coming to the magazine, the very first sight of the "Kanjoos Tech" cover with uncleji was really funny! Kudos to whoever made the character.

If it weren't for my limited bandwidth I would surely love to join Team Digit for a game of CS:Go. It would be a great honour to lose to you guys!

Serious stuff now: "Kanjoos Jugaad" and the "Kanjoos cheatsheet" were nice articles. "Budget superheroes" too. The one thing I liked the most is Robert's reply to Dhritirj Kalita. It's true, english is merely just a tool to convey an idea, to communicate. Nobody should judge people by their non-fluent english and silly grammar mistakes. Full respect.

The "Are girl geeks doomed? by Jayesh was well written. Keep up the good work!

Eagerly waiting for the next edition.

P.S. to Robert - You might not have a choice, but you look cool without hair. That's the "style" I was talking about. The small beard on your chin matches your handsomeness. Never change that :)

–Jay Sarma

It looks like Robert has garnered another admirer.

–Siddharth

I am a 15 year old student and a big fan of your magazine. As you might know, due to strike in haryana, internet services were temporarily suspended in some districts including mine. So I lived without internet for 10 days! I went through these times with nothing to do. Every now and then I kept checking when internet would work. I now understand how it has become a part of me. I missed the MWC because of it! (hope you cover it in you dvds).

Some suggestions:

1. A FastTrack on wireless technology (Wi-Fi, Bluetooth, cellular networks, a bit of history, li-fi, etc) and a dmystify on Light. Simple as that.
2. I see lot of budget mobile comparisons in your issues. The internet (almighty) is already flooded with them. Please write about other comparisons (like music services, apps, iot devices, etc.)
3. Like everyone is saying, we need a redesigned digit website and magazine. Also please launch the e-mag app soon.
4. Please include more about windows in your magazine.
5. I have been a subscriber since 5 months of your books as well as the mag and really it has satiated my science and tech hunger. Hats off to that.

–Rhythm

Hey Rhythm,
Nice to hear from you. Yes the internet is addictive. Unfortunately MWC happened just after we closed the DVDs for the march issue. The official videos released till that point were only minute long teasers. Since you are now back online check out our coverage here: http://www.digit.in/mwc/

All your ideas are definitely worth considering. Keep in touch.

–Siddharth

Hey Digit Team,
I have been reading Digit for quite a few years now. Let's see... it's been 3 years and 6 months to be precise and I really love it. The info it contains is more than awesome – whether it was about science or about tech, it's always great!

Now what is going to follow is just for dmystify team, so anybody who is reading this mail and is not in behind the making of dmystify, please close your eyes or better, turn around (just kidding).

@Team dmystify: I want to thank you from the bottom of my heart for making this small book of big thoughts. It's the best part of the digit magazine (according to me at least). I want to request you to please write a dmystify on gravitational waves highlighting their significance.

Keep up the good work Team Digit (and Team dmystify, and team Fast Track, and......)

–Bhavesh Suneja

Well right now you'll be surprised to know that Team dmystify comprises the amazing Robert. Yup, the words are almost entirely always Robert and I'm sure you've made his day.

–Siddharth

You three (Jay, Mithun & Sid) have actually done a really wonderful job with the Free Basics as a topic, last to last month. I'm especially pleased with the conclusion by Sid and I'm actually saddened to learn from the digit diary last month that he faced the 'heat' unduly, although not unexpectedly. I'm, for one, proud of the editorial team at digit for their immaculate ways of treating topics with utmost respect and clear thinking. Especially, what Mithun wrote had tonnes of fun in the paranoia expressed there and it did actually play against Sid to a greater extent than Sid's own piece did. That's a great kudos to the team work. Keep doing such great work forever Team digit!

–Narayanan R

Thanks for the vote of confidence Narayan. We're proud to have you as a reader too.

–Team Digit

dgt

GREED
For those who just want more than should be humanly allowed, we have enough to satisfy your hunger...

THIS MONTH: Yamaha YSP-5600, Lazareth LM-847, Bugatti Chiron, Harmony of the Seas, Brave Browser, LinkLadder and more...

TEMPTATION
If you're wondering what to do with yourself or how to spend some time getting cultured, this section is for you...

THIS MONTH: The Revenant, The Path, 11.22.63, Taboo, Must Listen music of the month, Do some spring cleaning and more...

TECHNOLOGY WITH STYLE

DESIRE > **SHOWCASE**

Intel Skull Canyon
Your tabletop gaming machine

Mini-PCs are gaining ground as computing devices that fit on your desk and still manage to offer you the complete experience of using a desktop. But would you consider buying a gaming mini-PC? Along with other manufacturers, even Intel thinks so too and their answer is the Skull Canyon NUC mini-PC. Accented with an intimidating design, it packs in a sixth-generation Skylake Core i7 CPU, DDR4 RAM and dual M.2 SSD slots, all inside a small 8.5-inch case. Playing games on any computer or console demands a powerful or good enough GPU running underneath. The Iris Pro graphics 580 does induce reluctance among gamers and if it makes you uneasy as

well, then you have the option of attaching a Razer Core expansion box where you can add a discreet graphics card such as the Radeon R9 Fury or the GTX 970. This will connect to the Skull Canyon through a Thunderbolt 3 port and if you're already worrying about the steep price of the entire setup, it's a genuine concern. The basic NUC will cost you around $650 and by adding

basic components such as 16GB RAM, 256GB SSD and Windows 10 will increase the price to a staggering $999. It doesn't end here. If you want a graphics update, the Razer Core is priced at $500 for pre-orders and then adding graphics card will cost you even more. Worth it? Well, if you don't have space at all and are fine with casual graphics, and need a powerful media server, go ahead.

Echo Dot
Following the success of Amazon's Echo, the voice-enabled Alexa system to rival the likes of Apple's Siri and Microsoft's Cortana, the company announced a smaller version called the Echo Dot that is cheaper and loaded with fewer features. But, it won't be easy to buy one since you'll need to be an Amazon Prime member and already must be an owner of the Amazon Echo or any Amazon Fire TV device. Thus, continues the trend of ultra exclusive products that are amazingly difficult to buy!

CRACUNS
The Applied Physics Lab team from John Hopkins University have built a drone that can stay submerged underwater for months and fly out whenever summoned.

Sulon Q
Claiming to be an all-in-one headset for your AR and VR needs, it doesn't require to be plugged into a computer or a smartphone, and it comes packed with a battery inside.

Verve Ones/Ones+
A pair of neat-looking wireless earbuds were launched at MWC 2016, out of which one of them is water/sweat proof and both will be selling under ₹20k.

Bloom Inhaler
Inhalers for asthma patients aren't exactly portable but a company is experimenting with Bloom, a super thin inhaler that can fit in your pocket or even your wallet.

Huawei MateBook

The MateBook is a new 2-in-1 hybrid tablet by Huawei. It has a full Aluminium unibody metal design, is 6.9mm thin, weighs 640g and is coming in two colour options. It features a 12-inch display which has a resolution of 2160 x 1440p. The display covers an 85% colour gamut and also has an 84% screen-to-body ratio which is greater than other competing tablets such as the iPad Pro and Surface Pro 4. Powered by a 6th gen Intel Core m processor and will be available in dual core m3, m5 and m7 processors.

The MateBook features a high density 4430mAh battery which Huawei claims can provide 10 hours of battery life. The company also announced a Stylus accessory called the Mate Pen which has 2048 pressure levels and also works as a laser pointer. Huawei claims that, an hour of charge will provide a usage of one month. The tablet has a fingerprint sensor which resides on the right edge of the tablet. To add more productivity to the tablet, Huawei also introduced the MateDock, a docking station which has a USB Type-A port, USB Type-C port, a micro-

USB port, an Ethernet jack and a battery pack. The hybrid tablet will be running on Windows 10 Home and Pro. Huawei has also announced a keyboard case for the tablet which will be available in four colours.

DJI Phantom 4

Don't you hate it when you're flying your drone in your neighbourhood and it hits a tree, falling down with scratches and sometimes fatal outcomes? Although, you must have already seen demos of several drones with the capability of detecting obstacles. And now, DJI is making this feature commercially available with the Phantom 4. Essentially, the drone will be able to detect walls, trees or any kind of obstacles coming in its way. It detects obstacles through five cameras – two at the front, two at the bottom and one through the primary 4k camera. While on the fly, the cameras work together to capture images of the world and send them through the computer vision software that recreates the 3D model of the world. Among the new features introduced in this drone, TapFly ensures that you don't need to be an expert with the two-stick controller. Here, you'll be able to set the maximum distance and let it travel the entire length right after take-off while you can view the live feed. Another feature called ActiveTrack will let you pinpoint a subject whom you want to always keep inside the frame. While tracking the marked subject, it will continue tracking and avoiding obstacles on the way. All the tracking and modelling sorcery won't come cheap since it's priced at $1,399.

Nike HyperAdapt 1.0

Nike has unveiled the the HyperAdapt 1.0, a sports shoe that can tie its own laces. What was once a piece of sci-fi tech in the movie Back To The Future, it has finally become a reality. The shoe features what Nike calls "adaptive lacing technology," at the back of which the company plans to come up with a whole new range of self-lacing sneakers. The shoes will automatically tighten once a user slips them on. This is made possible by a sensor that sits in the heel of the shoe. The sensor senses that a foot has been placed inside the shoe, triggering the self-lacing feature. The shoes will be available for purchase by the holiday season of 2016. With three colour variants, Nike says that the shoes will only be available to Nike+ members. No pricing details have surfaced yet and while we prepare to strap on these shoes, we dearly wait for the coming of the one and only true hoverboard.

iPad Pro (9.7-inch)

Apple unveiled the smaller, 9.7-inch iPad Pro which surprisingly wasn't named as the iPad Air 3, probably because they are getting rid of the "Air" branding. The tablet is powered by the A9X SoC and has a 9.7-inch 1536x2048 display. They have introduced a new feature called True Tone display that adjusts the colour temperature of the screen according to the surrounding lighting conditions. In addition, the new iPad Pro also comes with four speakers, which Apple claims to be twice as loud as the iPad Air 2. It also comes with a 12MP rear camera, along with a dual-tone LED flash which might be the same sensor placed in the iPhone 6s. For internal storage, they finally phased out the depressing 16GB versions with 32, 128 and 256GB. The 9.7-inch Apple iPad Pro in India will start at ₹49,900 for the 32GB Wi-Fi version, while the 32GB Wi-Fi + Cellular version is priced at ₹61,900. The tablet will be available in India by early April, in colour variants of Silver, Gold, Space Grey and Rose Gold. The iPad Pro Smart Cover and Silicone Case Pro will cost Rs. 3,700 and Rs. 5,200, respectively.

Elite x3

HP unveiled the Windows 10 powered Elite x3 smartphone at MWC 2016. The company also launched two docks with the device that would allow it to be used as a desktop or a laptop. The phone is equipped with a 5.96-inch QHD display with Gorilla Glass 4 protection. It is powered by Qualcomm's flagship chipset, the Snapdragon 820 clocked at 2.15GHz with 4GB of RAM. The device comes with 64GB of onboard storage that can be expanded by up to 2TB via a microSD card. At the back of the phone is a 16MP primary camera with an 8MP front camera. The device has a 4150mAh battery and comes with an iris scanner and a fingerprint scanner. There is also a front facing speaker by Bang & Olufsen.

The HP Elite X3 also comes with two docks called the Desk Dock and Mobile Extender. The Desk Dock comes with a DisplayPort, two USB Type-A ports, a USB Type-C port, and an Ethernet port. The dock is designed to be connected to any display, keyboard and mouse, and used like a desktop via Windows 10's Continuum feature. The Mobile Extender resembles a conventional laptop, but only houses a keyboard, battery, and a 12.5-inch Full HD display. The Extender uses the Elite x3 for processing power and connects to the device wirelessly.

MSI Vortex

The design of the Mac Pro looks elegant, sure, but what make it look badass? The MSI Vortex is exactly what our thoughts would have reflected. The mean looking machine is only 10.5 inches tall and offers a flexible amount of room for upgradability. This gaming cylinder packs in a lot of power with high-end components such as the Intel Core i7 6700K processor, up to 64GB of DDR4 RAM, SSDs in Super Raid 4 and place for dual NVIDIA GeForce GTX 980 GPUs in SLI. It features MSI's 360-degree Silent Storm Cooling technology so that the system runs cool even on the highest load. The cooling system ensures that the heat from the bottom of the body is circulated upwards. It's powerful enough to support multiple screens using the available six video outputs. At the bottom, you can find the 450W 80 plus Gold power supply. The Vortex comes with a proprietary Dragon Center Dashboard and app that lets you customise the lighting, monitor system performance and save custom profiles.

PlayStation VR

A surge of virtual reality hardware is being observed in the market with companies presenting their best iteration of a VR headset and accessories. Originally called Project Morpheus, the first prototype of the PlayStation VR was revealed at GDC 2014. The PS VR will be available from October 2016, with a price tag of $399 in the US, €399 in Europe, 44,980 Yen in Japan and £349 in the UK. The PS VR will run only on the PS4 and it has been priced way lower than the Oculus Rift and the HTC Vive – the Rift selling for $599 while the Vive is going out for $799. That's quite a price difference between them and although the PS VR isn't as powerful and you wouldn't need to spend big bucks on a powerful gaming rig to run the Oculus Rift or HTC Vive, which is great news for cash-strapped PC gamers.

There's another caveat albeit, the PlayStation VR pricing doesn't include the Move controllers nor the PlayStation Eye Camera. Users who'd want the complete experience will need to invest in these accessories which will end up costing the same as its other two prominent competitors. Sony expects about 50 games to be ready for the platform when it launches in October and around 230 developers have been working to build VR content for the platform.

SPECIFICATIONS
Display method: OLED | **Panel size:** 5.7 inches | **Panel resolution:** 1920 x RGB x 1080 (960 x RGB x 1080 per eye) | **Refresh rate:** 120Hz, 90Hz | **Field of view:** approximately 100 degrees | **Sensors:** accelerometer, gyroscope | **Connection interface:** HDMI, USB | **Latency:** less than 18ms | **Audio:** 3D audio with stereo mini jack and mic input

Dot

As far as smartwatches go, we've seen an entire host of devices from both small to big manufacturers and all of them have one thing in common – you need to be able to see the smartwatches to use them. But, not the Dot smartwatch. This timepiece is especially designed to aid the visually challenged user and features a braille interface. The Watch has been designed by a startup called Dot, in collaboration with SK Telecom. The aptly named Dot smartwatch features 30 raised pins, which display notifications in braille. The best part about braille notifications for the blind is that they no longer need to worry about the privacy issues that surface from the usual text-to-speech approach. The watch also comes with a seven day battery life, allowing for extended periods of use without the hassle of constant charging.

As far as usage is concerned, even though this is a niche category, the Dot watch may just be the first smartwatch which has real-world functionality. Also, a typical smartwatch mostly serves as an add-on to one's smartphone, but because of its braille notification feature, the Dot watch is a device that, if priced correctly, can make an actual difference. The Dot smartwatch is currently priced at $290, which is a little on the expensive side. For now, the watch is in the prototype phase and the startup plans to go into mass production by October this year.

TAKE MY MONEY!

Here is where we keep an eye on crowdfunded projects that will make you go 'Shut up and take my money!'

SpeedX Leopard

Cycling enthusiasts, your days of strapping on a smartphone to your bike are over. There's a new bike in town that's going to efficiently track your route and position at any given time with built-in GPS. That's right, the Leopard bike has its own little SpeedX Smart Control system that connects over Bluetooth. You'll be presented with all your ride data along with a professional analysis through the app. The XCoach module not just displays the collected data but also offers you interesting taks and challenges which are part of its professional training courses. The in-built sensors will be able to track 12 different types of cycling data such as lap time, cadence, speed, calories, weather, slope, etc. The Smart Control will be able to track data for up to 800km or 40 hours at a stretch whereas it takes only 30 minutes to fully charge. The main monocoque is made from T-1000 Military-grade carbon fibre which is extremely stiff and lightweight (around 1.2 kg). The bike's design makes sure that the wiring is cleverly hidden which would otherwise cause air resistance, hampering the overall aerodynamics. The bike is priced at around a lakh rupees.
Link: http://dgit.in/SpeedXLeopard

Olo 3D Printer

We're soon ushering an era of downloading 3D designs (of anything) and 3D printing it as per our convenience. An ambitious project called the Olo 3D printer is aiming to do just that. It's a highly portable 3D printer that uses the smartphone's screen to print 3D objects. How you wonder? Well, you place your smartphone inside the box, close the lid to block out light completely and then the smartphone displays the design in white light as the object is printed on top of a film. Olo apparently uses a new type of liquid resin called Daylight Resin which you need to pour inside the box before printing. Sounds unreal right? Also, it will be going on sale only for around ₹7k.
Link: http://dgit.in/Olo3DPrinter

How to participate in the contest

Register

Fill up your personal details at
http://bit.ly/meizu-app-mania

Tell Us

About your coolest, wackest, mind
boggling app ideas
(Tip: Think of Meizu while
conceptualising app idea)

Get Approved

Digit will approve the best app ideas
and shortlist the potential winners
for the contest.

Start Design

Once you are shortlisted,
start building the apps.

Prizes

Take home loads of prizes! and be the
Meizu App Hero

Attend

Attend the event by showcasing
the live URL of the app that
you have developed.

Terms

General:
-A person can enter the contest only once.
-Students currently studying in college/school are eligible.
-All Entries are handled through this widget. Your email address is required so we can get in touch with you if you win, but it will not be shared with any third party.
-Make sure that the account you use to enter the contest includes your real name and a contact email or Facebook login.
-This promotion is in no way sponsored, endorsed or administered by, or associated with, Facebook..

Refer the contest to your friends:
-Share your unique URL with your friends via email / Facebook / Twitter. For each friend that enters the giveaway through your URL, you will receive +10 (up to 10 entries)
 entry into the giveaway.

App Ideas and URLs:
-Winners will be chosen on the basis of the app ideas that they submit.
-Users with higher number of points stand a better chance to be chosen for Phase - II (App creation).
-All shortlisted winners of app ideas will be notified directly via email. Winners must respond within 3 days of being contacted. If they do not respond within that period,
 another winner will be chosen.
-After the app ideas get shortlisted, the winners are required to create app/(s) and submit app URLs to app@devworx.in.

Prizes and event:
-After reviewing the URLs, selected winners will be invited to attend the Meizu event in Delhi/NCR and collect their guaranteed Meizu device + other prizes.
-The shortlisted winners, who create atleast 3 apps but are not invited to the event, will still get their guaranteed Meizu device.
-Only students who are currently residing in Delhi-NCR will be invited to attend the event on 10th April, 2016.

MEIZU
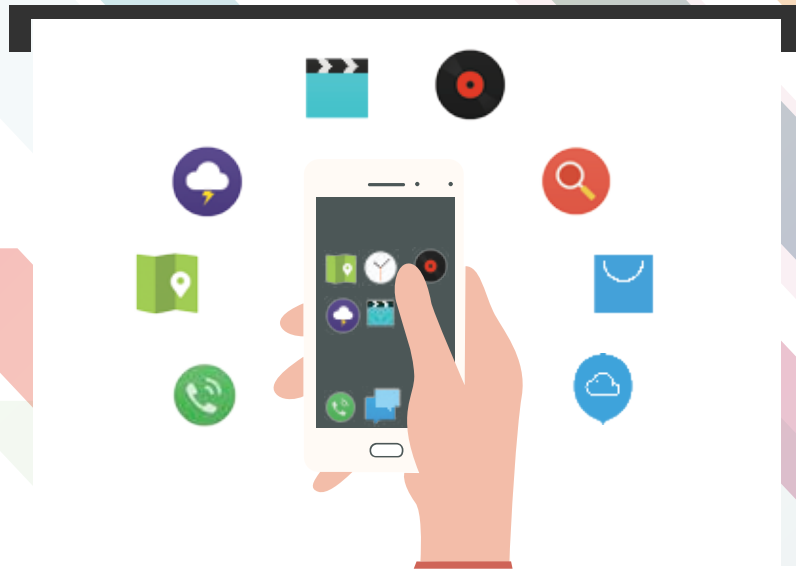
15th March-30th March

#APPtitude 2016

Share your coolest, wackest,mind
boggling app ideas
and we will just **FUND** it for you

Prizes worth **9 lakh** up for grabs!

1. App war hero [INR 200,000
2. Best fit for Meizu [INR 300,000(3x100000)]
3. App Creative King [INR 300,000(6x50000)]
4. 30 m2 phones to be won!

(You don't have to be Pro coder but

Creative thinking is must)

To Participate Go to:
www.digit.in/contest/
Facebook.com/MeizuIndiaOfficial/

Monument

Organising photos clicked after every special occasion can be overwhelming and wouldn't it be great to offload that task to someone other than yourself? Monument is trying to drive out this pain by acting as a central hub for all your photos and enabling their own algorithms to organise the photos according to the date, location, time and what's in the photo. It will classify your photos in default categories such as Time Machine, Favourites, Faces, World Map and Cameras. Using their Android and iOS app, you can send the files over to Monument for storage and access them whenever you want later. It uses an external USB device for storage and in the basic model, storage isn't included so you can connect your own storage device. It's selling for around ₹7k.
Link: http://dgit.in/MonumentStr

Tmouse

Working all day on a mouse can be tiring and potentially harmful, inviting the wrath of Carpal Tunnel Syndrome later. Tmouse is a mouse that can be transformed at will according to your preference in two grips. One includes the regular palm grip while the other grip is something similar to you clenching your fist. All this can be done easily by moving the slider forward and backward, and snapping the right and left click button. Once transformed into the smaller grip, the scroll wheel is replaced with a touch bar in the middle. It also additional buttons such as the DPI switch, forward and backward buttons on the left side of the mouse. The mouse will be available in both wired and wireless options, and also in black and white colour variants. Along with regular browsing on your desktop, it can also provide good comfort and ergonomics to gamers, too. Currently, the Tmouse is selling for ₹3k, for anyone interested enough in buying it.
Link: http://dgit.in/TmouseKick

Flexwarm

Smartjackets have been a thing for a while now. Another one joining the club is Flexwarm whose temperature can be controlled from a smartphone. It packs a smaller and lighter battery inside powering the heater that keeps you warm. It's supposedly said to be accurate to a single degree and have a longer, durable battery. Made from waterproof/water-resistant material, it's unique climate control feature is integrated inside the jacket that adjusts the temperature inside automatically according to the external environment temperature. The Flexwarm is selling for around ₹13k.
Link: http://dgit.in/FlexwarmJckt

VIE SHAIR

It's always nice to have options when it comes to having an open air or closed air headphones. VIE SHAIR's 3D moulded frame let's you do exactly that and you can switch between them on the fly. Sitting right above your ear canal, the directional flat speakers ensure you get to hear everything. The frame ensures that your ears don't hurt even after wearing the headphone for a long time. The open air design makes minimal contact with your ear and hence prevents sweat or heat. Another cool feature about the headphone is that you can broadcast audio to an unlimited number of other VIE headphones. Available in black and white, it's priced at around ₹13k.
Link: http://dgit.in/VIESHAIR

MOBILE WATCH

Stylish, glamorous and interesting smartphones are always on the horizon. We take a closer look at what's hot in this space...

HTC 10

The absence of a "One" or "M" in the title isn't a typo and HTC could be dropping it completely for their next flagship. According to popular leak specialists Evan Blass (@evleaks) and @OnLeaks, both confirmed the name of the next device to be HTC 10. What appears to be a screenshot from the device, the latter tipster has confirmed the device name. The launch of the previous One M9 didn't exactly turn out to be an appealing one and this time, the company needs to shake things up, especially a radical change from the previous copied design from you know who. Pictured here is a rendered version by Hamdir (http://dgit.in/HamdirHTC10) based on the design of a leaked photo of the prototype. Rumour has it that this flagship will be packing high-end specs including a Snapdragon 820 chipset and 4GB of RAM. Storage options are available across 16, 32 and 64GB, and it's said to also house a micro-SD card slot. The phone might pack a 12MP camera sensor following the company's concept of large pixels. On the software front, it will run Android 6.0 Marshmallow with their own HTC Sense 8 skin. A flagship smartphone in today's date will be a disappointment without a fingerprint sensor, and it will be interesting to see the company's take on this technology.

Meizu Pro 6

A few years ago, octa-core CPUs on mobile phones seemed like an overkill but now several smartphones around you are powered by the same. Do you know what freshly sounds like an overkill? A deca-core processor. And the first phone to ship with MediaTek's powerful Helio X25 chipset is going to be Meizu's Pro 6. This news came out fresh off the rumour mill after it was spotted on GFXBench benchmark. Compared to the current Helio X20 chipset, the upcoming one is clocked higher at 2.5GHz instead of the Cortex-A72 cluster running at 2.3GHz while the Mali-T880 MP4 GPU is clocked at 850MHz rather than 780MHz on the Helio X20 chipset. Among the other visible specs, it sports a 4.6-inch 1080x1920 display, 4GB of RAM and 32GB of internal storage. The 20MP rear-camera will be capable of recording videos in 4k (3840 x 2160) whereas the 5MP front-camera will let you take selfies. The Meizu Pro 6 will run on Android 6.0 Marshmallow.

Pictured here: Meizu Pro 6

Pictured here: Samsung Galaxy Note 5

Samsung Galaxy Note 6

Still one of the best Android smartphones out there, the Galaxy Note 5 will soon see its successor's release. It's said to be codenamed Grace and expected to release sometime close to July, supposedly running Android N out of the box. There isn't much news on the design side and it isn't clear whether the phone will have a new body design. The Note 5 has a 5.7-inch screen and the Note 6 might have a larger screen. It will surely continue the S-pen and it would great to see new functionality implemented. The Note 6 will pack 6GB of RAM and 128GB of internal storage, but since Samsung started producing 256GB memory chips, who knows if they plan on using one in their new flagship. Looking at the Galaxy S6 and Galaxy Note 5 phones, they had the same CPU and camera, so we might see the Galaxy Note 6 running the Exynos 8890 CPU along with the 12MP camera sensors.

EXAMINED

Really cool products come to the Digit Test Centre which don't really fit into the standard product categories that we review in the Bazaar section. We write about them here mostly to make you turn green with envy.

Crazy number of drivers
Soundbars usually pack a single-digit number of drivers but since this one wants to be an unusual piece of gadgetry, it packs an overwhelming 46 drivers. If this isn't crazy, we don't know what is.

Line array speakers on each end
Dolby Atmos is nothing without the height channel which has been made possible with six line array speakers (28mm units) placed at both ends of the soundbar, making a total of 12.
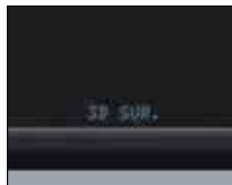
Over-glorified Bluetooth speaker
With support for AirPlay, Bluetooth and MusicCast (proprietary app), you'll be able to stream songs wirelessly across various file formats such as MP3, WMA, Apple Lossless, WAV, FLAC and AIFF.

Yamaha YSP-5600
Another device to bring Dolby Atmos in your home

That huge TV in your living room is useless without a high-quality speaker system, and with Dolby Atmos already having made its way for home entertainment, it's time for an upgrade. But slow down there, Atmos at home consists of different setups. The best experience can be achieved by installing speakers on your ceiling but it's expensive and becomes limited to one location of your room. Upward-firing speakers may sound like a more desirable option since it can be moved around the room but now, considering the price and flexibility, Yamaha's YSP-5600 soundbar sounds like the preferable product to pick up. They are calling it a sound projector since the drivers inside are directional, following the principles of beamforming. This makes it possible to direct the sounds to any seating area of your room. Available at a cost of ₹1,50,000, we had an opportunity to experience the device at Dolby's own labs.

Opt for a third-party subwoofer
The YSP-5600 doesn't include a subwoofer, something essential to offer that complete theatre experience. The optional SWK-W16 Wireless Subwoofer Kit accompanied with the soundbar won't be available in India and since it's expensive, you should go for any third-party wired or wireless subwoofer.

DROOL MAAL

Get your drool on and behold some of the fanciest, ostentatious and drop dead gorgeous things money can buy. Droolworthy?

Body and aerodynamics
They have developed an adaptive chassis which uses an extremely rigid carbon fibre monocoque. The engineers were able to ensure lower drag by designing the front in such a way that turbulence as a result of rotating wheels can be avoided.

Exhaust system
A Titanium exhaust has been used since it needs to be lighter as it comes with 4 pre-converters and two main catalytic converters, which are almost 6 times larger than the catalytic converters used on normal cars.

Gearbox and transmission
An all-new 7-speed dual-clutch gearbox has been specially designed to handle that massive 1600 Nm torque. The transmission sends power to all four wheels preventing those Michelin tyres from shredding, which by the way, cost ₹2,95,132 approximately per set.

Bugatti Chiron
"Nothing is too beautiful, nothing is too expensive"

Bugatti unveiled its latest car, the Bugatti Chiron, at the Geneva Motor Show. Not only does the car look good, it has some serious horsepower as well — 1,478 horses worth, in fact. This means that it can easily break the world record for the fastest production car. It can do 0 to 100 kmph in 2.5 seconds and Bugatti has actually limited its top speed to 420 kmph for road usage. When you're done picking up your jaw off the floor, scroll forward to know how the Chiron achieves these crazy numbers. The car uses diamonds in the speaker system and the price tag is ₹17,68,45,780 approximately, excluding taxes. It doesn't end there — all this is driven without a transmission. Yes, there is no gearbox. Excited? Well, we are.

Engine and fuel consumption
The 8-litre W16 engine sits behind the two seat cockpit and is turbo-charged by four turbochargers. The engine is almost 25 percent more powerful than the Veyron. At top speeds the engine gobbles up 60,000 litres of air every minute.

SPECIFICATIONS
Engine: 8-litre, W16 | **Horsepower:** 1500 horsepower | **0 to 100 kmph:** 2.5 seconds | **Top Speed:** 500 kmph+ (estimated, not tested yet) | **Max Torque:** 1600 Nm (2000 to 6000rpm) | **Weight:** 1,995 kg.

Lazareth LM-847

Remember the manufacturers who put a V12 engine in a quad-bike? Well, they are back at it again with the LM 847. As crazy as it can get, they have installed a roaring 4.7-litre Maserati V8 engine capable of generating 470 hp at 7000 rpm. Such a massive amount of horsepower would have been difficult to contain, so the French company decided to go with two rear tyres from Michelin who have their own chain drives. It weighs around 400kg where its chassis is made of a polymer and carbon fibre combination. Although it tries to deceive its way into calling itself a powerful superbike, it's technically a quad bike. The exposed components are well polished and neatly placed, setting off vibes of a well-groomed automotive version of Frankenstein. It would be a spectacle to actually watch someone riding the bike.

Harmony of the Seas

The world's largest cruise ship is currently under construction at the STX France shipyards which will be ready to set sail this month. Harmony of the Seas is Royal Caribbean's third Oasis-class cruiser that has a capacity of about 5,500 passengers and seven neighbourhoods. Also, it can hold an additional 2,400 crew members in the 16-deck ship, weighing in at around a gross tonnage of 226,000. While the fourth vessel in the line is simultaneously being constructed which is due in 2018, this one stands 1,187 feet long and is capable of cruising at a top speed of 23 knots. With such a huge area on deck, there are endless avenues for recreational activities? It's also said to have the fastest internet connection at sea. Instagram, ahoy!

APP WATCH

Brave Browser

Although, an in-built ad blocker is a highlighted feature in Brave Browser, the most useful feature is floating bubbles. It works the same way as Facebook Messenger's chat heads concept. For instance, if you're scrolling across Facebook and tap on a web link, it pops open up the web page in a bubble. While the bubble loads the page, you can continue scrolling through Facebook. With this, you aren't forced to leave the original app and several bubbles can be opened up along the way. The bubbles are able to load pages faster since it strips away normal ads and tracking.

App Store: http://dgit.in/BraveiOS
Play Store: http://dgit.in/BraveAnd

LinkLadder

You must have found yourself stuck at situations where you needed an electrician, a maid or a carpenter right away but could only procure their numbers after banging your heads a little. Although this bottleneck is being resolved by hyperlocal services, LinkLadder is pushing a different way of connecting you directly with professionals rather than acting as a medium. If you're looking for a plumber, you can directly search for and contact plumbers. While signing up for the app, you willingly let your number and profession be discoverable to other users of the app. As rightly stated by the company, this is more like a digital yellow pages.

App Store: http://dgit.in/LinkLadderiOS
Play Store: http://dgit.in/LinkLadderAnd

Pyoopil

We are still seeing several education apps, all providing the same features of listing a horde of courses across various categories and subjects. Pyoopil is trying the same thing but they are trying to include courses from a wider variety through a simple user-interface. The courses available on the platform consist of both free and paid ones, where the free ones include courseware from MIT, Stanford, IIT and other such institutions who release free lectures on the internet. The app makes creating courses really simple and mentors can deploy their courses in a matter of minutes.

Play Store: http://dgit.in/PyoopilAnd

CRITIQUE

In this section, we put stuff through the grinder and closely examine what comes out; everything except gadgets, because there's more to life than just that

The Revenant

The one that finally clinched it!

Based on the real life events of Hugh Glass, a frontiersman in the early 1800s, The Revenant, is one gritty movie that manages to bring to life the tribulations of Mr. Glass in all aspects, making it a visceral and primal experience. And it's primarily thanks to Leonardo's impressive acting skills. However, the movie fails to maintain the tempo throughout all 2.5 hours. The director felt it prudent to include the boring periods as well, and since a spoilt generation we are, it does feel a little out of place. And it isn't just Leo, even Tom Hardy does a commendable job, as he has always done. But regardless of how much ever praise you pile onto the others, all their efforts shall forever be overshadowed by the fact that this is 'the movie' that finally got Leo his Oscar.

Rating: ★★★⯪☆

- Mithun Mohandas

Must Listen
Where would we be, if it weren't for la musica?

While we throw in our sweat and blood into making the magazine possible for you guys every month, we turn towards games and music frequently so that we don't go insane. Although you'll come across the games we play in the Unwind section, here you'll find the brilliant covers we heard the previous month. Mostly covers of classic and immortalised songs, we're sure that the following set of songs will find a permanent place in your playlist.

Heart - Stairway to Heaven

What happens when a legendary band covers a legendary song composed by a legendary band? Epic proportions of applause follows. You might wonder "legendary" was kind of overused but after hearing Ann and Nancy Wilson from Heart cover the timeless Stairway to Heaven by Led Zeppelin, you'll be reminded how wonderful the song is and how they pulled off a brilliant tribute.
http://dgit.in/HeartLedZepSTH

Walk Off The Earth - Somebody That I Used To Know

You might have already visited Walk Off The Earth's channel where they cover songs in unusually complicated ways such as this one itself. Here you'll find all of them working a note on the same guitar while on other videos, you will find a different setup. A talented bunch of people and a great channel to subscribe as well.
http://dgit.in/SombdyUsdToKn-wWOTE

Richie Castellano - Bohemian Rhapsody

Queen's Bohemian Rhapsody is another timeless song and you'll come across hundreds of covers on the internet. Recently, we stumbled upon one performed by Richie Castellano. Not only did he hit the right notes but performed the song in the similar fashion followed by the original music video.
http://dgit.in/BohRhapRichCast

11.22.63
A Hulu original, this show is based on Stephen King's novel, produced by J.J. Abrams and James Franco as the lead, who enters a time portal to prevent the assassination of JFK. Should be a good movie, don't you think?

The Path
Nothing extraordinary about the first trailer, but the mystery behind the creepy depictions of some cult following starring Aaron Paul looks interesting. This is another Hulu original that we just can't wait to watch.

Taboo
Tom Hardy plays the role of a man thought to be dead long back who has returned to take back what rightfully belongs to him. A dark and strong story, the producers include Ridley Scott.

Bored out of your wits? Can't think of any fun thing to do? Worry not, we'll take that burden off your shoulders in our Things To Do section every month. Read on!

Do some spring cleaning

With spring having officially sprung, here's how you can harness tech to get some spring cleaning done

Blooming flowers, butterflies in the garden, vibrant and sometimes eye-hurting colours in everyone's wardrobe, all these can only mean one thing - It's Springtime. Marked in India by the festival of Holi, for which we are sure many of you had a heck of a time scrubbing those colours off. With the same vigor and dedication, get started with some spring cleaning everywhere around you with the help of these technologies.

Clean your smartphone

One of the woes of feature packed mid-range and low-range smartphones is facing a shortage of memory and storage space from time to time. Although there are inbuilt features with the OS almost everytime, they aren't always user friendly and that gap is filled by cleaning apps, both for memory and storage space. **Clean Master** for Android is one of the easiest to use.

Clean your house

Yes, yes, we know that you already do it everyday. Yes, we also know that you may have gadgets to do it. What we bring to you, is **iRobot**'s **Roomba** series of vacuum cleaning robots for your home and office. These cleaners are fully automated and all you need to do is push a button to start it. The device remember's its location in the room and also detects cliffs and edges to avoid falls. It can detect particles upto 1 micron size and its low profile is highly suited for cleaning under sofas and tables. All without you moving a muscle, yet watching it with great intrigue. On a sidenote, iRobot also has Mopping, Pool Cleaning, Gutter Cleaning robots.

Clean your air

Laws being made to reduce air pollution seemed like a fable even a short while ago. Yet, in our own country, we are getting regulations imposed, like the odd-even rule, that have no other purpose than reducing air pollution. That is why you also need to pay attention to the quality of the air around you, mainly inside your house, especially when the air purifier market has grown to Rs. 150 crore from almost nothing in the last few years. Some of the best purifiers that you could go for are from Philips, Eureka Forbes, Panasonic, Crusaders depending on your price preference. There are portable versions available as well.

Clean your mind

The complaint of the human mind being dumbed down by technology is heard a bit too often nowadays. And it is quite a common sight seeing people boring down into their smartphones and tablets, unaware of their surroundings even after putting it down for a while. The same effect is also observed in people who have been working for a long stretch. It is for these situations that you need something to rid your mind of the technology

lumosity

stagnation. Try **Lumosity**, the highly rated brain training app that aims to increase your brain's overall sharpness. A group of scientists and researchers analyze complex neurological exercises and transform these into simple game type exercises that are both fun and refreshing to partake in, even if their claims to actually increase your intelligence might be widely questioned.

Clean your e-Garbage

Gadgets might be your coolest possessions during their lifetime, but as soon as they exceed that time, they become a combination of whatever substances that they might be made of, just waiting to be disposed. Most gadget components are made of chemicals that are highly hazardous if disposed improperly. Tech companies are taking a stance regarding this by offering to buy back their old devices from customers in lieu of a reduced price on a new device. You can also contribute by finding a hardware vendor in your city who buys old defunct hardware at a reduced price, sometimes just paying for the metal and other constituents, rather than dumping it in the garbage from where it might be disposed off into water-bodies as pollutants.

DRM

IMAGING: PETERSON PJ

We trace the emergence of Digital Rights Management (DRM) and how it has affected various forms of intellectual property historically

Intellectual property has always been a highly disputed area of law since quite a long time. From the point of view of a creator or designer, they do have the right to have a say in how their creation is utilised, due to the effort they have put into it. From the same point of view, they also believe that they deserve a share in any commercial gains made through their creation - directly or indirectly. On the other hand, if sharing and altering a creative idea or a concept can lead to the creation of something new and better, is it really fair to restrict the same?

In the technology age, everything from Digital Artwork to Music is created and marketed digitally. And to cover the ownership rights of the creator, there is the concept of Digital Rights Management, or DRM. Digital Rights Management technology refers to the tools that allow restrictions to be placed on copyrighted media and software applications to control their usage, (re)distribution and alterations. Now, there are arguments throughout history that fight for justifying this control and then there are arguments trying to convey that this entire concept is harmful to everybody as a whole.

The Early days
One of the most significant and earliest cases that can be put forward as a significant precedent regarding legal control over intellectual property is the invention of FM radio. One of the most significant problems in early day Amplitude Modulated (AM) radio broadcasts was static interference from external sources like electrical equipment and thunderstorms. Many inventors had tried in vain to find a way to overcome this limitation. Edwin Howard Armstrong was working for the Radio Corporation of America (RCA) when he formulated a method to successfully overcome AM

radio's limitations by modulating the frequency of the transmitted signal, giving rise to the FM radio technology that would eventually revolutionize the radio industry.

What RCA had asked him to work on was a way to filter out static. What he had invented was something that was a direct competition to RCA's existing infrastructure and business. As a result, RCA had delayed further research into the same. Meanwhile, Armstrong was granted a patent for FM radio in 1933 and had performed successful demonstration after demonstration that showcased the never-heard before clarity that FM brought to radio broadcasts.

Knowing the potential of this technology, Armstrong took it to other players in the market like Zenith and General Electric. He also heavily lobbied the Federal Communications Commission (FCC) to create an FM broadcast spectrum between 42-50MHz and himself invested in creating a small but high-powered network of FM radio stations to truly broadcast the superiority and promote the adoption of FM. But the RCA had other outcomes planned for FM.

RCA had hired a former head of the FCC before the second world war broke out to deter the spread and adoption of FM. Although their pre-war efforts were largely unsuccessful, during the war the nation was largely preoccupied with other matters and it was no surprise that when the war ended, the FCC came out with a number of regulations that effectively crippled FM. Citing flimsy reasons and unreasonable potential technological problems, FM was forced to move to a higher band, which rendered the existing FM stations and devices useless. Regardless to say, the public, once burned with their now useless FM radios, was further hesitant to get new devices for the new bands and the arrival and propagation of television sealed FM's fate. After a number of drawn out expensive lawsuits, Armstrong ended his own life. Proprietary interests had completely obliterated the good intentions of a true innovator.

One of the earliest instances of copyright laws was the adoption of the first copyright act by the British Parliament. Known as the Statute of Anne, the law stated that the copyright of any author over

Edwin Armstrong was one of the first victims of a major corporation misusing laws in the spirit of DRM

their own book was valid only for 14 years, and had to be renewed after that if the author was alive. And this law was much less powerful than the ones we are familiar with now - it did not restrict adaptations, translations and derivative works of any kind. At that point of time, copying and piracy was not a major concern mainly because copying and publishing was an expensive thing to do and was only handled by major publications.

Forget your peers

Fast forward to the present day - the internet has become the universally accepted medium for exchange of information of any kind. And as a result,

it is much easier to violate copyright now than it has ever been. The basic nature of digital information entails that any kind of digital information can be copied now with highly easy-to-use methods and often require no expertise of any kind in the field of work that the original information deals with. As a result, there are DRM regulatory technologies that are sometimes strict enough to inconvenience genuine users.

Since the advent of internet, a new form of file sharing had emerged - peer to peer(p2p) file sharing. Even though the technology might have evolved over time, the basic principle is still the same - having access to files in a network of connected computers connected via a central server at a large scale. Even though the technology of file-sharing was in place for a while, it was truly popularised at the turn of the century by Napster.

Napster was started by the then 15 year old Shawn Fanning in his university first year as a network that allowed connected users to download compressed digital music files, especially MP3, from any machine on the network. What popularised it compared to other p2p services is that Napster used its central server to index the music on connected users' machines and made the data searchable across their network. And what popularised it even more was the landmark lawsuit that went on to set a standard regarding intellectual property: A&M Records, Inc. v. Napster, Inc.

In course of the lawsuit, Napster cited many defences (inability to differentiate
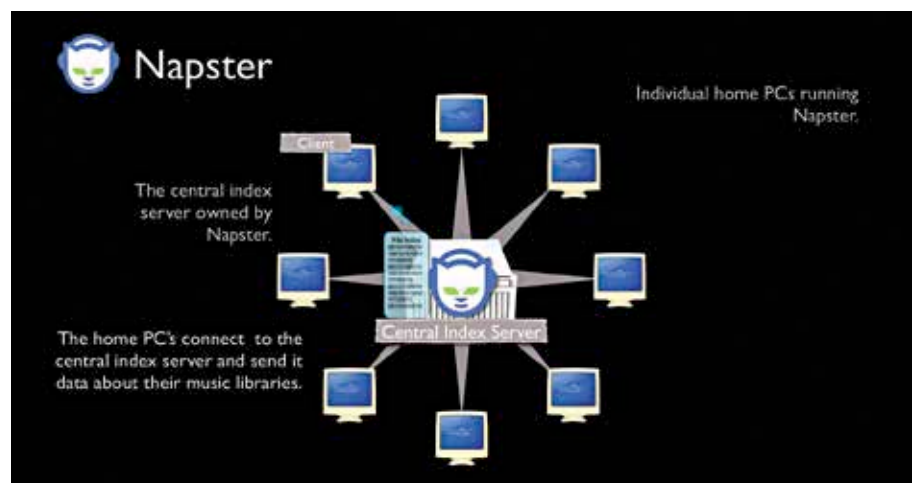
Napster worked by indexing the connected computers using a centralised server

WATERMARKING

Watermarking, although itself not a full fledged DRM-technology, is a tool used to aid the larger goal of DRM – to identify copyrighted material obtained illegally. It is a form of steganography that embeds metadata or identifying information into media. This embedding is done by altering or adding some information into the underlying code that forms the structure of the digital media.

between files that did and did not violate copyright, encouragement to file sharing by digitizing music in the first place etc) that were struck down one by one accusing Napster of insufficient policing. In September 2001, Napster agreed to settle the case by paying $26 million and by May 2002, Napster had filed for bankruptcy, thus ending its first incarnation. This set the precedent that any unregulated peer to peer file sharing is illegal and harmful to the original copyright holder.

Hence it hasn't been anything surprising that technology has been repeatedly outpacing the law that governs it in terms of copyright infringement. The MGM Studios vs Grokster case in 2005 is considered by many to be the sequel to the Napster case. Filesharing services like BitTorrent and torrent sites like PirateBay have been facing long legal battles but the opposition has so far been unable to shut these services permanently, thanks to very freedom and anonymity that internet stands for.

All these locks

DRM currently comes in many shapes and sizes. For example, for computer games alone, there have been multiple forms of DRM as shown in the table below

Another notable area where DRM has a strong-ish hold is eBooks. Adobe, Amazon and Apple that provide the software and the backend infrastructure to support the entire publishing process have their own DRM methods that are designed to restrict copying, alteration and exchange of ebooks from their proprietary devices or applications. In one of the most significant examples in recent times, in July 2009 Amazon remotely deleted copies of George Orwell's Animal Farm and Nineteen Eighty Four from customer's Amazon Kindles and offered them a refund. Amazon cited the reason as copyright violation because the company that was publishing and selling the books on Amazon's platform did not have the rights to do so. They couldn't have chosen a more perfect book right?

The music industry has contributed significantly to the progress of DRM technology. After initial compatibility issues with CDs that came with DRM technology, in 2005 Sony BMG included new DRM technology into their CDs that covertly installed DRM software on the users' computer without explicitly asking for their permission. Along with the obvious issues with this, the software also included a rootkit that introduced a security vulnerability that could be easily exploited by others. Eventually, Sony had to recall most of the CDs that included this software and provide a cash compensation or a free album download to users.

DRM and Music Streaming

With the rise of music streaming in the later 2000's, there came the need for newer forms of DRM. Perhaps the most popular music content provider at the time of its

inception, Apple's iTunes worked with its own FairPlay DRM that allowed music obtained via iTunes to be only played on Apple devices and Apple's Quicktime Player. Apple even launched a higher quality iTunes Plus format in May 2007 that could be obtained at a higher price.

Napster, in its second incarnation also adopted DRM tech. Their method allowed the user to stream an unlimited amount of music while the subscription was valid by downloading the music in WMA format. When the subscription expired, all downloaded music was made unreadable until it was renewed.

The keys to the locks

One of the most recent testaments to DRM was Steve Jobs' 'Thoughts on Music' open letter back in 2007. In the essay, he cited the requirements of music labels as the only reason why iTunes was still persisting with DRM. In his words -

"Imagine a world where every online store sells DRM-free music encoded in open licensable formats. In such a world, any player can play music purchased from any store, and any store can sell music which is playable on all players. This is clearly the best alternative for consumers, and Apple would embrace it in a heartbeat."

Meanwhile, Apple itself has been on the receiving end of an antitrust lawsuit that accused its iPod devices and iTunes of quashing competition by preventing any other music store from working on their platform.

Even at present, DRM remains one of the most highly debated technologies in the world of content sharing. Either the proponents of intellectual property get to assert their right with the content and impose stricter regulations, or the activists against DRM get to convince the law that the harm which DRM causes to legitimate users is far more than the harm caused by illegitimate users. The true answer to the DRM conundrum shall always be an elusive balance that allows valid cases of reproduction and attribution without robbing the original creator of the benefits that they deserve. 🄳

DRM FREE

Label proposed by the Free Software Foundation for DRM free works

Method	Description	Games
Limited Install activations	Limited installations from a particular disk by verifying each installation over an online server	Mass Effect, Spore, Call of Duty 4, Assassin's Creed, Crysis, Bioshock
Persistent Online Authentication	Constantly downloaded bits of the game from online server to complete otherwise incomplete game	Silent Hunter 5, Assassin's Creed 2, Settlers 7, Diablo 3,
Software Alteration	Game plays out differently if pirated copy is being used	Operation Flashpoint: Cold War Crisis, Serious Sam 3: BFE
Product Keys	A license key is required mid-installation for it to proceed further	Just too many examples!

IMAGING: ANIL T

WHY SHOULD YOU CARE ABOUT Vulkan API

Arnab Mukherjee
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"Game" and "Configuration" are two words that are heard together almost too frequently together. Whenever an intriguing new game or the next big instalment of a popular game is announced, the first thing we check is the prescribed minimum system requirements. Apart from the basic details like RAM, Graphics memory, Operating System required, we don't look into the requirements too deeply.

When it comes to Graphics APIs, most of us have only heard of DirectX and Metal for Mac, that too not as Graphics APIs, but as a piece of software that needs to be present for a certain game to run on our Windows PC or Mac. Chances are that most of us don't really know their purpose and how the new low level Vulkan API is going to affect them.

The roadmap to the present

Back in the days, when computer games used to be mind blowing due to their mere existence, games were simple enough to run directly off hardware. If you see the game as a piece of code, this code ran directly on the underlying hardware like any other piece of code and required no intermediary. There was little or no reusability between games. The design approach for games was Bottom-Up to make optimal use of the hardware. Even though the 1980s saw the presence of some generic game development tools like ASCII's RPG maker, Pinball Construction Set etc, most game developers who developed for the arcades used in house game engines to create games for each type of arcade device.

Over time, the underlying hardware gradually got more powerful and consequently complicated. Directly interfacing with the hardware was either no longer feasible or required a herculean amount of effort for any kind of software developers. The concept of device drivers was introduced as a layer between the hardware and the software application. This was also necessary to make the software function on the variety of devices emerging into the market. A Graphics API (Application Program Interface) is also a specialised driver that is required for communication of standard functions and instructions used by the application and supported by the driver, which in turn acts as a translator for these instructions to be encoded as commands to the hardware.

During the mid-1990s, Id Software's DOOM and Quake became so popular that other developers preferred licensing core portions of the game and overlay those with their own level designs, characters, gameplay mechanisms, graphics i.e. the actual "content" of the game. Eventu-

ally, games began to be designed with this approach in mind, leading to Epic Games' Unreal Engine and other such game engines. A Game Engine behaves as a higher level library that implements abstract concepts like entities, material, camera, lights using the capabilities of the lower Graphics API, like mesh, texture, shaders etc.

At present, both Games and Game Engines are incredibly complex and expensive to make. Most Game development studios have stopped focussing on developing game engine technology and prefer to use existing options in the market such as Unity3D and Unreal Engine. Consequently, graphics drivers have also become substantially complicated. As a gamer, it might escape one's attention but one look at the size of the installer tells us the amount of

graphics compared to the open standard that PHIGS was.

But due to competition from Sun Microsystems, IBM and Hewlett-Packard's own 3D hardware being brought into the market with extensions made using the PHIGS open standard, SGI began to lose market share. In an effort to regain the same, they turned their own standard open source and renamed it to OpenGL.

OpenGL was more than a mere rebranding. It overcame drawbacks in IRIS GL that prevented an application from implementing and using a feature that was intrinsically unsupported by the underlying hardware. The control of OpenGL was handed over to OpenGL Architecture Review Board, which was an industry consortium of companies like Apple, IBM, Intel etc.

DirectX. Incidentally, DirectX did support OpenGL. For example, if a developer chose to use the OpenGL 3D graphics API, other DirectX API's were combined with it to be used for games because there were some features of DirectX that OpenGL did not provide, like joystick support.

For the console side of Microsoft's ventures, DirectX formed the basis for the entire Xbox range's API. The entire API was developed by Microsoft in conjunction with Nvidia which built the hardware for the Xbox. In fact, the Xbox was originally named DirectXbox, but later renamed for commercial purposes.

On one side, as Microsoft has been gunning their DirectX efforts, the control of the OpenGL was passed to another industry consortium called the Khronos group in July 2006. The Khronos group consists of a much larger scale of companies like AMD, Apple, Google, Mozilla, IBM, Samsung, RedHat, Microsoft, Oculus, Panasonic, Nintendo, Pixar, Lucasfilm, Amazon, Valve, Unity, Nokia, Nvidia (We are sure you get the drift!). Further development of OpenGL was handled by the Khronos Group.

Metal for iPhones and other Apple devices debuted in iOS8 and aimed to bring support and benefits of similar APIs in other platforms to the Apple Ecosystem. Metal's features differentiated itself from OpenGL by mainly reducing the CPU overhead and explicit synchronization between CPU and GPU, which basically reduced the number of tasks to be done by the CPU leaving it free to take up additional load.

AMD's proprietary solution, the Mantle API was introduced to the market when the only other major API options were Microsoft's Direct X on Windows and OpenGL on many other platforms. The low level API provided significant benefits such as a highly reduced CPU overhead, Native Multi-GPU support, Explicit command buffer control etc. To the player, the reduced overhead and fewer direct calls to the CPU meant that the players with high-end GPU's would be getting much better frame rates than before as the GPU was no longer held back by the CPU. But, quite similar to Metal, Mantle was also restricted to work with AMD's own hardware, for reasons attributed to lack of industry support or internal decisions,
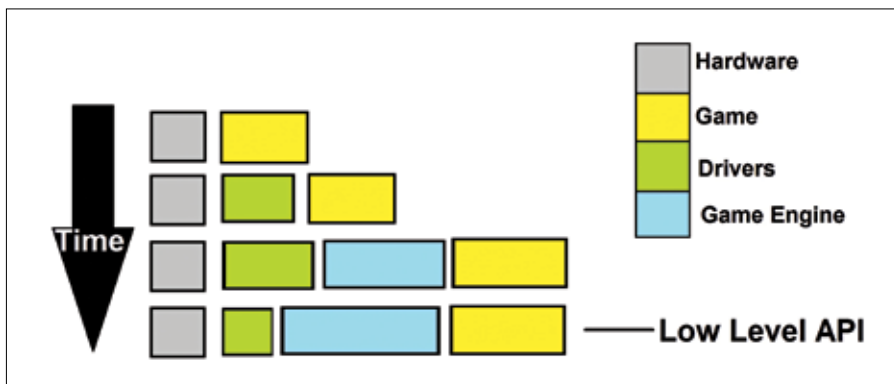
The above diagram shows how the interaction between the hardware and the application has evolved to the present

code that goes into something that does not directly contain any of the actual graphics or media assets. That is because each driver has to implement a lot of APIs (DirectX versions, OpenGL versions etc) and also has to be backward compatible. This complexity and enforced compatibility often leads to unnecessary overhead and unwanted bugs.

The story of the predecessors
The history of Graphics APIs began much before the 90s but one of the main boosts was received during that era. PHIGS, the standard being used by the industry for Graphics development, was gradually replaced by the IRIS GL API by Silicon Graphics, mainly due to ease of use and immediate mode rendering, which was more suitable for rendering more complex

In the mid-90s, Microsoft had released the first version of its own proprietary API package as Windows Games SDK which they later named DirectX. Even though initial adoption of DirectX was slow with programmers, publicity efforts along with thorough testing and compatibility measures from Microsoft gradually grew its popularity within the Windows Platform. Prior to DirectX, Microsoft had included OpenGL support for WindowsNT targetting engineering and CAD applications and the Direct3D API in DirectX was originally intended to be a low level support for usage like gaming. Over time, as graphics grew more complicated, OpenGL also included multimedia support and programmers got the option to choose between the open-source OpenGL and Microsoft-only

In it's short existence, Mantle did get the support of some AAA titles like Battlefield 4

The Galaxy S7 supports Vulkan API

hence the benefits of the low level API, like Native Multi GPU support, were still not felt beyond Windows machines using AMD's hardware.

Mantle was eventually shelved and AMD had officially advised developers to move out of the ecosystem. What it had achieved in its lifetime is a propulsion to move from DirectX and OpenGL to a much better Graphics API solution.

Why Vulkan?

With the widespread boom of Smart-phones and rise of Smartphone gaming, there was a high demand for a lower overhead API that could be ideal for port-able devices. But as we saw in the previous section, most efforts were either ecosystem-bound or relying on API technology developed almost 25 years ago. There was even a significant gap to be filled for the Operating Systems that did not fall within the proprietary ones that we mentioned in the earlier section.

The Khronos Group kickstarted the development of a next-gen Graphics API in July 2014 and officially announced the project with a call for participation in Dec 2014 at the SIGGRAPH. AMD handed over their Mantle API to form the base of the next gen iteration of OpenGL from Khronos. Although they initially targeted a 2015 release, the production was delayed and the Vulkan API was officially released with specifications and SDK on February 16, 2016. As of now, Android, Windows and Linux have Vulkan SDKs available.

One of the major gains with this API will be improved visuals on Linux as well as SteamOS gaming. Even Macs will gain visual improvement because Vulkan is much better performing than Metal as a low level Graphics API. A significant concern regarding SteamOS had been the lack of optimal performance in some games, which will definitely be improved with the inclusion of Vulkan support on SteamOS. Along with the specs, Khronos has also released a set of conformance tests that each manufacturer can use to demonstrate spec compliance. On the very day when the Vulkan specs were released, Nvidia, Intel (Linux), Qualcomm (Android) and Imagination technologies (also Linux) have posted their successful results of the same tests.

Note: Both the tests and the specs are available on GitHub and the Khronos group is inviting contributions highlighting incon-sistencies of different drivers so that their developers can realign the drivers.

The basic nature of an API that works at a level that is lower than the existing ones is that much of the work that was the respon-sibility of the drivers is now to be handled by the game engines. The advantage of this is that the game engine has significantly higher information about that exact work and can make calls that the driver itself doesn't have the capability to do. And that allows the API to run with a much smaller, faster driver with support for features like multi-threading. For example, the multithreading support itself will directly

benefit cases where the CPU has to handle a lot of load and leaves the GPU relatively unoccupied. And any application that cannot afford performance hitches can now directly include the GPU memory management into their implementation.

As we have already emphasised, Vulkan is platform independent and already supports a number of platforms. Although it is a bare bones API, Vulkan does support the addition of layers on the stack that can deal with validations and debug data. The original intent of the Khronos group is that a large number of these layers should be created by the developers. For example, A particular developer like Intel can verify parameters pertaining to their chipset to avoid func-tions that are known to perform bad on their devices.

To sum it up...

A graphics API is one of those pieces of technology that we don't really bother with when setting up the latest game or preparing ourselves for our next major video hardware purchase. And thanks to developments like Vulkan, that decision has now become even safer with a uni-versally applicable API. Combining the universal appeal of the OpenGL and the dedicated power and capability of DirectX and bringing all of that into, amongst other platforms, your smartphone, Vulkan API support is something that you should be looking forward to seeing in a lot of upcoming phones this year.

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SPACE STATIONS

The History of Space Stations: Mankind's outposts on the Final Frontier

IMAGING: PETERSON P.J

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This year, 20th February marked the 30th anniversary of the launch of the historic Mir Space Station. Owned and operated by Russia (then known as the Soviet Union), this low earth orbit space station orbited the earth for about 15 years until it was finally deorbited on 23rd March, 2001. For almost the entirety of its existence, Mir was the largest artificial satellite in orbit until it was succeeded by the International Space Station (ISS), which also broke Mir's record longest continuous human presence in space at 3,644 days. Mir Still holds the record for the longest single human spaceflight, an honor that goes to Valeri Polyakov who spent 437 days and 18 hours on the station between 1994 and 1995.

The success of space stations like Mir marked a pivotal point in the mainstream success of space exploration programs.

Suddenly, every superpower wanted to put an astronaut on their own extraterrestrial home to help forward the progress of science and space exploration. In fact, the concept of the orbiting space station was first conceived as early as the 60's by scientists on both sides of the Cold War, who were fighting their own battles to decide who would be the first to rule the frontiers of outer space.

The Race to the first space station

Devised in part as a response to the the United States' successful Apollo program, a program that saw them place the first man on the moon, the Russians launched the Salyut space program, which aimed to launch and sustain the first manned orbiting space station. Under this program, they constructed and successfully launched the Salyut 1, on April 19, 1971. The Salyut 1 would go on to be the first of many stations under this pioneering program.

Featuring a monolithic design, Salyut 1 had several compartments that included three pressurized cabins, two of which were usable by the crew. Like all space stations that would come after it, accessing the Salyut 1 required the use of a docking spacecraft. For this the Russians used their Soyuz 7K-OKS spacecraft, which had already seen numerous successful launches. The launch of the Soyuz 10 on April 23rd, 1971, marked the first ever manned expedition to the Salyut 1, and the spacecraft comprised a crew of three Soviet cosmonauts (a Russian-coined term for astronaut). Unfortunately, their attempts to hard-dock the spacecraft were unsuccessful, and they were forced to abort the mission.

June 6th of the same year saw the Soyuz 11 perform the first successful attempt to dock a spacecraft on the Salyut 1. The Soyuz 11 flew 362 orbits in a duration of 23 days. but owing to technical problems on board the Salyut, the crew

had to cut short their mission and were transferred back to Soyuz 11 for re-entry to Earth. Tragically, a pressure relief valve on the spacecraft malfunctioned during re-entry causing a loss in cabin pressure and the death of the brave cosmonauts.

America's entry into the space station race

Seeing the success of the Salyut program, the United States was not one to hand in the towel, especially when it meant conceding to the Russians. Unfortunately, funding for space programs were at a premium, especially after the severe dent the Apollo program caused in America's fiscal budget. As the program began to lose steam in the early 70's, NASA (the National Aeronautics and Space Administration) started the Apollo Applications Program, which aimed to launch unused hardware (leftover from the Moon missions) into space for research and exploration.

It was in this program that rocket engineer Wernher von Braun conceived the idea of building a space station from an unused rocket stage. Despite reduced funding, NASA scientist tested and tweaked various prototypes until they landed on the final design of what would be the United State's first ever orbiting space station: Skylab.

Houston, we have a problem

The day of the launch of Skylab, May 14 1973, is a day that will go down in the history books of NASA as one where Murphy's Law reigned supreme. The myriad of technical issues faced by the astronauts and ground crew of Skylab is almost legendary. It all began 63 seconds into its

THE FIRST SPACE TOURISTS

As the Soviet Space Program began getting pressed for funds, they thought up the ingenious idea of space tourism to help inject some essential cash flow for further Space Exploration. Japanese TV channel TBS were the first to strike a deal with the Russians, which involved flying reporter Toyohiro Akiyama to Mir, a privilege for which they reportedly paid between $12 to $37 million. Another famous space tourist to Mir was chemist and Mars chocolate company employee Helen Sharman, who also has the honour of being the first ever Briton in space. Sharman was selected through Project Juno, a program conceived as cooperative arrangement between the Soviet Space Program and a group of British companies.

launch, when the earth's atmosphere tore off the ship's meteoroid shield taking with it two primary solar panels and damaging the third one, thus depriving Skylab most of its electrical power. The situation only seemed to get worse as additional damage to the ship's antenna confirmed that the ship's communications system had severely malfunctioned.

The ground crew at NASA's Marshall Space Flight Center rushed to stabilize the situation by putting the station at an altitude that would minimize overheating. Crew members were forced to conduct emergency repair procedures that included manually deploying a solar array, erecting a sunshade to avoid overheating and con-

ducting an improvised docking procedure after a failed initial docking attempt. While definitely looked at as a sour note in the history of American Space Exploration, Skylab's botched launch also proved that fixing a damaged space station while still in orbit was not an impossible task.

During its orbital lifetime, Skylab's crews were able to conduct a number of crucial scientific experiments, including confirming the existence of coronal holes in the Sun and using sensors to recorded data in the visible, infrared, and microwave spectral regions of earth. Skylab's last crew departed the space station in February 1974, leaving it in unmanned orbit. Despite NASA's repeated plans to send additional crews, budgetary restrictions and the advent of additional space programs meant focus had to be shifted elsewhere.

Russia's re-entry into the space station game

The United State's withdrawal from manned space station programs left the door open for the Russians, who were itching to discover the next technological breakthrough in space exploration. Enter the Mir space station. Famous for setting numerous space-related records, Mir will be best remembered for two truly pioneering feats. It was the first space station that boasted a modular design and was constructed in space by engineers who had to assemble individually launched modules – starting with its core module that was launched in 1986.

Secondly, instead of following traditional protocol that involved bringing home all cosmonauts posted on the station and subsequently launching a new crew, the Russians decided instead to conduct "changing of guard" that would take place on board the outpost itself. This gave Mir its famous moniker of being Earth's first ever permanently manned extraterrestrial outpost. However, this so-called permanent status was severely tested in April 1987, when Mir cosmonaut Aleksandr Laveikin was diagnosed with potential cardiovascular problem and was in danger of being shuttled back to earth. Russia was steadfast in their resolve, and instead of putting an end to long-standing expedition record, they sent within three months a replacement

Full scale model of the Salyut 7 with two docked spacecrafts

Mir as seen on 12th June 1998

cosmonaut along with a support crew to the station in July in order to preserve Mir's permanent manned outpost status.

Despite their best efforts, Mir could not sustain its permanent expedition status, and had to be eventually abandoned for a few months in 1989 when ground testing damaged a Soyuz spacecraft headed to the station. This incident proved to be only a small blip in the record, as Mir would go on to remain occupied for near a decade.

ISS and the new age of cooperation
Despite the success of the Mir space station, there were numerous reports emerging about the apparent and imminent end of the Soviet space program owing to the collapse of the Soviet Union. These rumors were squashed after the creation of the Russian Space Agency, the leaders of which quickly moved to make an agreement of cooperation with NASA for a joint space venture. The likes of such a venture were not thought of since the conception of the Apollo–Soyuz Test Project in 1972, a space program that marked first joint U.S.–Soviet space flight as well as the last flight of an Apollo Program spacecraft.

The first of these new cooperative programs was the Shuttle–Mir program, which saw a total of nine American astronauts visit Mir between 1995 and 1998. These missions gave NASA astronauts their first exposure to long-duration spaceflight since Skylab, while teaching both nations the importance of cooperating towards building a new and more-improved modular manned space station. For the betterment of space travel, these plans

did eventually come to fruition and marked the birth of a space program that would bring to life to the now world-famous International Space Station (ISS).

Similar to the Mir, the ISS is an low Earth orbit man-made satellite and is currently the largest artificial body in orbit (which, in the right circumstances, can be seen with the naked eye). True to the program's spirit of international cooperation, early modules for the ISS were launched by Russian Soyuz rockets as well as American Space Shuttles (until the latter program was shut down in 2011). In fact, the ISS program is a joint venture that includes not just NASA and Roscosmos (Russian Federal Space Agency) but also JAXA (Japan Aerospace eXploration Agency), CSA (Canadian Space Agency) and ESA (European Space Agency), which includes 22 member nations.

One of the main objectives of the ISS is to provides a unique platform for conducting scientific research, chief of these being microgravity conditions and exposure to the harsh, unforgiving conditions of space. In addition, space stations like ISS offer an environment in which studies can be performed for potentially decades, something that was not previously possible with manned spacecraft. This opportunity has paved the way for extremely interesting experiments from developing technology for more advanced space exploration to studies on the effect of space-like conditions on human health.

COOL SPACE EXPERIMENT

The effect of boiling water in space is a unique phenomenon that was first observed by astronauts aboard the ISS. On earth, boiling water creates tiny bubbles that rise from the bottom of the vessel to the top, effectively transferring heat across the water being boiled. In space, however, hot air cannot rise since there is no gravity to force the colder air to the bottom. As a result, the bubble of heat formed by boiling the water in space just continues to grow trapping all the heat within it and ensuring the boiling water does not even get warm.

Reports on 28th March 2015 claimed an agreement had be orchestrated between Roscosmos and NASA to collaborate on the development of a replacement for the ISS. This report was based primarily on an announcement by Igor Komarov, the head of Russia's Roscosmos, who stated that "Roscosmos together with NASA will work on the programme of a future orbital station". He also stated that the first step towards this would be to continue operations on the ISS up to 2024. While this sounds like exciting news, NASA spokesman David

SpaceX Dragon capsule on its way to deliver cargo to the ISS

Weaver stated that the agency appreciated the Russian commitment to extending the ISS but he did not confirm any plans for a future space station.

Bringing the final frontier closer to home
Space stations like the ISS also serve as a destination for newer spacecrafts designed by space agencies including national bodies like NASA and JAXA as well as private-owned ones like SpaceX. Since it's launch, the ISS has welcomed a variety of space vessels including prominent ones like NASA's Space Shuttle, Russia's Soyuz, Japan's HTV (H-II Transfer Vehicle), the ESA's ATV (Automated Transfer Vehicle), and most recently SpaceX's Dragon capsule. We haven't even mentioned the potential applications for space tourism, highlighted by Boeing and Sierra Nevada Corporation's plans to dock their manned CST-100 capsule and Dream Chaser space plane, respectively, with the ISS. With the increased interest in space travel and the tangible advances in space exploration technology, it seems only a matter of time before feasible commercial space tourism becomes a reality. 🄳

All hail, Passive Wi-Fi!

A true breakthrough in wireless communication

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Since time immemorial mankind has strived towards convenience and comfort. Our ability to introduce convenience in everything we do is only outmatched by our ingenuity to make our lives more comfortable through it. And thanks to some student geniuses over at the University of Washington, everyone's increasingly indispensable digital comfort – the gateway to our digital addiction – i.e. Wi-Fi networks are going to become a whole lot efficient. This in turn will accelerate the practical implementation of a whole new era of digital interconnectedness that we've all been waiting for – IoT.

As a technological breakthrough, Passive Wi-Fi has some astonishing claims to its name. Claims that will have networking brands beelining at the gates of University of Washington and Jeeva Wireless – a startup that plans to commercialize the technology – eager to get a piece of the impending wireless revolution.

But what is Passive Wi-Fi?

It's a research project conducted by two PhD students (Bryce Kellog and Vamsi Talla) in the Electrical Engineering department at University of Washington, a study that conclusively aims to reduce the power draw in wireless communications by several thousand times, a crucial breakthrough to extend Wi-Fi in low-powered sensors and long-term embedding scenarios. Just how power-efficient is Passive Wi-Fi? It claims to be 10,000 times more energy efficient than conventional Wi-Fi, and up to 1,000 times less power consuming than "low powered" Bluetooth and ZigBee networks. Yeah, let that sink in for a moment.

How is it different than conventional Wi-Fi?

The answer to this question can't be appreciated fully unless we take a closer look at the radio antenna used in conventional Wi-Fi routers and beacons. These Wi-Fi radios have two critical components – a digital baseband and analog RF, where the baseband is responsible for the digital information sent or received via analog radio waves. The problem arises
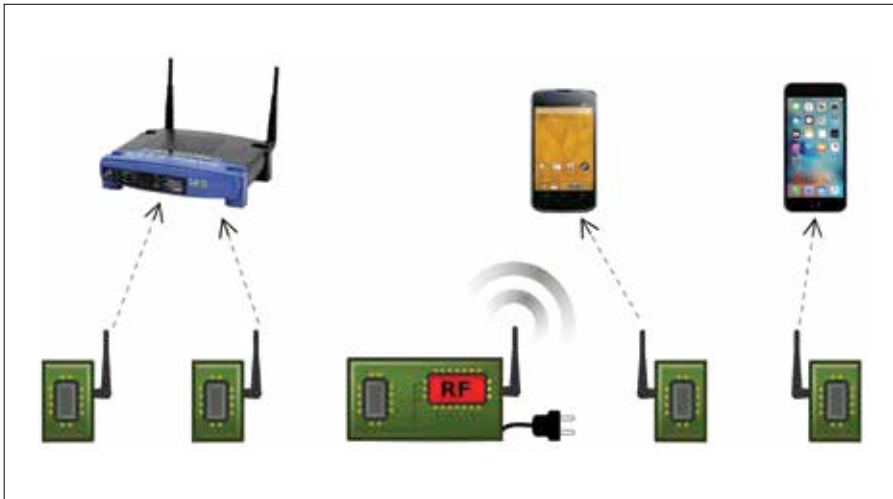
How Passive Wi-Fi will work

due to the starkly different power consumption levels of the digital baseband in comparison to the analog RF – where the digital baseband consumes 10 microwatts (µW), the analog RF can consume over 100+ milliwatts (mW) of power. And since the analog RF component in Wi-Fi chipsets is integral for transmitting and receiving data packets, you have to stick with it. Without it, your phone, router, smartwatch, laptop, etc., simply cannot communicate with each other.

In short, analog RF seems to be indispensable for wireless communication to take place. But that's the point – it's not indispensable. That's the whole premise on which Passive Wi-Fi is based on, as it tries to re-imagine wireless radio communications without a critical analog component in it. That's the gamechanger, right there!

Passive Wi-Fi: How it works
What Passive Wi-Fi proposes to do is to have the analog RF component present along with the digital baseband in just a single plugged-in device – like a wireless router or laptop – in any wireless network. Power draw here isn't an issue because the device is plugged into a power source, obviously. For all other non-plugged in, battery operated wireless clients connecting to the wireless network – things smartphones, smartwatches, iPod, etc. – you can have Passive Wi-Fi chips that don't have the analog RF component in them.

How do these Passive Wi-Fi clients communicate back and forth? Since most popular Wi-Fi networks operate at 2.4GHz or 5GHz frequency, the router produces the single radio frequency required for establishing communication between itself and the Passive Wi-Fi devices. That frequency is transmitted to your (Passive) Wi-Fi-enabled device

> **Our first offering will be a development kit which allows product developers and engineers to try out Jeeva's exceptionally-low power WiFi modules in your prototypes. These modules allow your device to communicate with a WiFi network for a fraction of the power cost of the best available conventional WiFi transceivers. We tentatively expect to be selling development kits by the second half of 2016."**
>
> **AARON PARKS**
> CO-FOUNDER, JEEVA WIRELESS

through passive sensors that have only the baseband chip. Those Passive Wi-Fi devices not only pick up the radio signal but also mirror it around them, sending forward Wi-Fi packets to any device that has a Wi-Fi chip in it. If this sounds confusing, just watch this video: http://dgit.in/PassiveWiFiVid

In a comment published in Wired, Vamsi Talla, who's working on the Passive Wi-Fi project, explained: "The low power passive device isn't transmitting anything at all. It's creating Wi-Fi packets just by reflection. It's a transmission technique that's ultra low-powered, as opposed to a network device."

Experimental evaluation of Passive Wi-Fi so far claim that "transmissions can be decoded on off-the-shelf smartphones and Wi-Fi chipsets over distances of 30-100 feet in various line-of-sight and through-the-wall scenarios," according to the University of Washington's website. The researchers also designed a Passive Wi-Fi IC to evaluate power draw of these wireless data signals. They found that roughly 1 and 11 Mbps transmissions consumed 14.48 and 49.28 µW of power, respectively.

This is big news, because transmitting radio waves at such ridiculously low power consumption levels is tough. Technically, the principle that Passive Wi-Fi uses to create a Wi-Fi network across several devices at such low power consumption levels is called backscattering, which is different from a more traditional mesh network (deployed in ZigBee, Bluetooth LE, etc). In backscattering, nodes blindly transmit data whenever they sense it – Passive Wi-Fi just implements backscattering at never-before-seen levels of power efficiency.

How is Passive Wi-Fi going to change the world?
While Passive Wi-Fi is exciting and promises to revolutionize wireless communications technology, we mustn't get too ahead of ourselves just yet. Remember, for most parts, whatever we've seen of Passive Wi-Fi still remains a tightly controlled research experiment.

There are several hurdles to cross, both with respect to implementation

speed and commercial availability. Right now, Passive Wi-Fi isn't really a viable alternative to conventional Wi-Fi simply because of its operating bandwidth – right now, Passive Wi-Fi can only support speeds of up to 11 Mbps, which is roughly the same as Wi-Fi 802.11b speeds – what was fashionable way back in the mid-2000s. The Passive Wi-Fi protocol would need to be severely refined if it has to be accepted in our homes any time soon, because forget about streaming YouTube videos or gaming on those speeds.

Also, Passive Wi-Fi chips will need to get into all the devices that we hold dear for us to truly make use of the benefits it bestows. That's what Jeeva Wireless is tasked with, a startup founded by the lead researchers of Passive Wi-Fi to ensure Broadcom, Texas Instruments, Atheros, Qualcomm, and other big semiconductor manufacturers, adopt the tech-

Passive Wi-Fi works with off-the-shelf smartphones, too

nology at the earliest, as they manufacture and control the ICs and chips that go into our routers, laptops, smartphones, and other devices. The researchers have suggested that the tiny Passive Wi-Fi devices are extremely cheap to make, costing less than a US dollar, for instance.

At mass production, the scale of volume will no doubt drive down the cost even more significantly.

What cannot be doubted, though, is Passive Wi-Fi's potential to breathe a whole new life into IoT (Internet of Things), allowing battery-operated, deeply embedded sensors to transform into Wi-Fi beacons. Imagine your running shoes, coffee maker, car, highway toll booth, security camera and countless other devices start getting connected simply because the power problem doesn't matter anymore. Passive Wi-Fi holds the power to turn the dream of smart home into a reality sooner than we would've thought.

IMAGING: ANIL T

COMPUTATIONAL Creativity

As implausible as it sounds, could it really be a thing?

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Before we've even begun, we know what you are thinking. "The heart and soul of a creative human being can never be replaced by a machine."

Well, imagine walking into an art gallery replete with critics and journalists hustling and bustling all around. Imagine being transfixed by one particular painting which seems to allude to different instances of war in a mix of colour and strokes. You are moved by the painting and so you look at the nameplate to see who created it, where it's written 'The Painting Fool.' It takes you a minute but you realise what that is – it's a program created to produce art. Now you look back at the painting – can you look at it the same way?

What we described above isn't a hackneyed plot of a low budget sci-fi film set in the near but unrealistic future – it is happening right now.

Recently, Google's AlphaGo program, a machine which has learnt the game by being fed millions of instances of GO matches in addition to playing against tweaked versions of itself, beat the world Go champion 4-1, and at the same time ticked off Facebook's director of artificial intelligence research who apparently was building the same machine but had not achieved anything cool with it yet. The victory was not the highlight though. The computer played a certain move in the second round which was considered strange and almost wrong at first, but revealed itself to be an excellent move as the game progressed. This got everyone scratching their heads and once again brought the idea about machines being creative back into focus. How did the machine surprise us like that with a move which goes against all that we knew about the game? (More

about the game and the victory here http://dgit.in/AlphaGoV)

So can machines truly be creative?

Before we head there, have a look at the heart of this hype – something known as machine learning.

Machine learning is a type of artificial intelligence which provides computers that uncanny ability to understand data and take further action without being explicitly programmed. The process traditionally begins with it looking for patterns in data. However, instead of merely removing that data and placing it in the hands of us human beings, it goes a step further. Machine learning implies that the machine uses this data to adjust its own actions, and thus change and grow.

Have a look at the kind of e-Artists machine learning has helped create, and what these machines in turn have created.

Floating solar homes
Here are some of the best floating solar homes in and around the world you can probably live in ever. **http://dgit.in/Homesol**

9.3

iOS 9.3
Apple's iOS 9.3 introduced some really cool features for iPhones. Here's a list of some of the cool features to try **http://dgit.in/9point3**

Tomorrow's tech

Computer generated music: We now have Liquid Notes (http://dgit.in/LiqNotes) and Maestro Genesis (http://dgit.in/Mae-Gene) which the creators claim are tools which allow a music composer to go further than he or she has been before, and with more ease. These programs, simply put, receive a few inputs from the composer about a particular musical technique and goes on to produce virtual instrument sounds in a large number of variations, giving the composer an idea of how his work will sound without the grunt work behind it. Omusic, an album composed entirely by AI Melomics109, sounds a bit like overly dramatic elevator music but is undeniably an achievement in the arts and, if nothing else, could at least be the end of the Kenny Gs we are forced to endure while trying not to breathe in a closed compartment full of strangers. (Listen to Omusic here http://dgit.in/CrMusic)

Painting: You would be right in thinking that painting is a very far-fetched concept for a computer to excel it. It's subjective, can be bizarre, and ties in all the culture, art, and psychology one knows onto a canvas in what can be an abstract manner. This didn't stop these guys from trying to do something similar though. The manner in which this was done initially was that the artist comes up with a concept, and then the algorithm generates the visuals for these either beginning from nothing at all or from pre-existing material. Art creating program AARON though, aims to do a bit more. Its creator, Harold Cohen, wanted that dependence on the human to be minimised so that it can be called an artist in its own right, sans the mood swings. He did this by teaching the robot about object and body elements and the relationship between them, instead of merely feeding it images. This means that the program can draw a table or, say, a cat, not because it knows exactly how it looks, but because it knows what the relationship between different elements in a cat and a table is like, resulting in some cool avant-garde art. Over four decades, the machine learned to place objects or people in a three-dimensional space, paint in colour on canvas using fabric dyes, and as its proficiency

And then he said, "My computer plays better than you"

grew, its paintings managed to even make its way into the homes of pipe-smoking, yacht-owning private collectors who paid more than 60,000 rupees and more for these machine generated paintings.

Out of the many art generation programs and machines that have been created though, the Painting Fool (http://www.thepaintingfool.com/) is one which stands out. Initially created to generate art from photos, the program increased in refinement, moving from the kind of filters and other elements one would expect to see in programs like Photoshop into a certain type of modelling where certain keywords that are first be supplied by an external agent are then scrutinised by the AI form the image.

Years later, the creator gave The Painting Fool the gift of 'imagination' by giving it the ability to interpret ideas with lesser constraints, and without necessarily having to refer to a specific image.

This was realised when the software downloaded a news story on the Afghanistan war, picking up specific words to flick from Flickr. The program then rendered these images in an aesthetic, arty manner and made a collage out of them. The scenes contained a fighter plane, an explosion, a family, an Afghan girl, and a field of war graves, placed in such a manner which would have been regarded as drama for the eyes.

Remember when we mentioned that project AARON was the attempt to create an artist sans the mood swings? Well the creators of The Painting Fool thought that even that is an element which cannot be left out. They once setup the program to draw the portraits of visitors to a gallery, but it would refuse to draw if the last 10 articles it read on the Guardian website were downers. Because, well, machines have feelings too, if you tell them which ones to have.

Writing: Closest to our hearts and on par with games, technology, science, psychology, music, and all the good stuff, writing is another art which it would seem is inimitable. US-based Automated Insight's Wordsmith platform threatens to put the grunt journalist out of work by churning out reports on sports, profitability and business much faster and with much more reliability than ever before.

No computer, I DON'T think I should leave it to you

You still have to make it though

The bragging point of these machines is that they take piles and piles of complicated data which a regular human being would spent numerous coffees and curses poring over, and translates it into coherent, fluid writing that is able to communicate the basic ideas or the highlights of the events.

PageKicker, (www.pagekicker.com) a program created way back in 2012 with slightly loftier ambitions, attempts to write complete books using simple queries. They search and study sources from all over the web like Wikipedia and certain publisher-submitted documents, combining them in a favourable order. But this is, once again, quite far away from creating readable, coherent books. There currently exist software which currently can create short stories, but these either end up creating stories which are devoid of any heart or drama and end up working as rehashed stories from the past, or just end up creating sentences which are grammatically correct, but don't really mean anything like "Privacy is the iniquitousness which a diligent fool can surmise." See the thing is, more than ever, the relation between words along with the relation of these words in the entire scheme of the sentence, and then the relation of the sentence to the heart of the entire write-up is still difficult to automate. Colours may come together in beautiful, unexpected ways. Words, not so much.

Cooking – Yes. Cooking. We've come to that stage where in addition to competing that dish you keep raving about oblivious to the aura of jealousy created, your mom has to now compete with machines with access to all the recipes ever created, courtesy IBM.

The beginning, as you'll see in a lot of these processes, begins with humans downloading information such as the description of cuisines specific to regions, combined with data on the concentration of different flavour ingredients in different food items, and a lot more data on food ingredients.

All of this is poured into the machine's 'blender' where an algorithm, developed to combine ingredients using a 'novelty' factor, works to produce a result which will be a surprise to that keen connoisseur

My research shows that this house is very small

who wants to use choice euphemisms to make the cook feel bad. This stage is carried out using 'flavour pleasantness' which the computer understands by using a set of flavour combinations which we humans find pleasant, for example, by not mixing ketchup with pickle, and by understanding the other physical properties of the item like its surface area.

The final stage of course requires a human to enter a starting ingredient and their preferred gourmet choice of cuisine, after which the computer creates a number of dishes, complete with even reasoning for its choice. Try asking your mom why she chooses to serve her ingredients in exactly that proportion, and let us know if she tells you anything more than "Because."

Where do we go from here?

Let's look at this from another angle for a minute. Laura Schulz, associate professor of cognitive science in the Brain and Cognitive Sciences department at MIT, held an experiment with toddlers. (Watch the video here http://dgit.in/BbyMnd)

The child here is seated in front of a table next to his mother. On the other side of the table are two people, let's call them Judie and Anna. On the table is placed a toy hammer with a button. Sasha makes a big show of the toy, places it in front of her on the table, and presses the button on it. A jingle of sorts plays from it, exciting the child. Now Anna takes the hammer and presses the button, but this time, there's no sound. Sasha takes the hammer back and tries again and once again it works. With Anna, again, it doesn't. Now they give the toy to the child, leave a replica toy on the table, and leave the room with the toddler and his mother. The child presses the button, but there's no sound. He looks confused for some time, and eventually passes it to his mother, probably hoping for a solution.

Now, this scenario was replicated, except with a slight change. With a new guinea pig and his mother seated on one side of the table, it begins in the same way. Sasha presses the button, and the sound plays. Anna presses it, it doesn't. This time when Sasha tries it again, it refuses to work. Anna then takes it and tries it, and

this time it works. They again leave the room with the toy in the hands of the child, after placing a similar toy on the table. The child tries to press the button but gets disappointed when the sound doesn't play. This time however, instead of getting help from their mother, most of the kids reach out to the new toy instead, possibly having understood that maybe, just maybe, there's something wrong with the toy.

What this means is that the toddler, who we assume has a bottom up understanding of what's happening in the world, actually on some level is able to make decisions based on data and probability, and it is this startling fact which puts into perspective everything we've been doing and trying.

The mind, is a wonderful thing

See, we don't like tooting our own horn and all that, but the human mind is pretty awesome, and attempting to recreate that is a flawed approach, an opinion shared by many of the creators of the above innovations. Creative output requires a variety of elements like the ability to think laterally, the ability to spot ideas which are all around us, the ability to build on ideas, and arguably most importantly, information. Machines have a leg-up when it comes to information, and it is this crucial advantage which can make them collaborators in the creative process, and not wannabe replacements. Whether it is the What-If Machine's (http://dgit.in/WhIfMcn)

random situation generator which makes up scenarios like "What if there was a dog which could not walk anymore and so decided to ride a horse everywhere", to the recipe generator that's interspersed with human input – the idea is to use the machines to their full strength, and in partnership with them, produce something novel and beautiful which the world hasn't seen before.

This is one of the main reasons why a machine is not likely to steal your job soon. Well, unless your job does not require any sort of human, creative input, like copying data from some source and vomiting them out onto a template while a certain catchy-song is hummed.

But we don't do that anymore, do we? 🔴

U MAD BRO?

TO TROLL, OR NOT TO TROLL,
THAT IS THE QUESTION

THE EVOLUTION OF TROLLS

PEOPLE HAVE BEEN WRITING ABOUT THIS CREATURE CALLED THE INTERNET TROLL FOR SOME TIME NOW, MOSTLY UNFAVOURABLY, LIKENING THEM TO TERRIBLE MUTATIONS THAT WE HOPE WILL DIE OUT. SHOULD THEY?

BY **ROBERT SOVEREIGN-SMITH**

Every one of you has already encountered an internet troll. Even if you've not been the target of a troll attack, and don't even know what a troll is, you've certainly seen someone on social media who had to deal with them. If you've ever read the comments of a popular video on YouTube, or if you've read comments on popular Facebook posts, you know that there are some people out there who deliberately like to stir things up and cause debates to get heated, and topic of discussions to get derailed.

Those of you who have lived a life before the internet will know that there always were some people who were like this. Some of us would have had friends (or classmates) who would fit this description of a "trouble-maker. However, is that really the definition of the word "troll"?

WHAT IS A TROLL?

There are several different definitions to be found on the popular site urbandictionary.com, and to be honest, we think all of them kind of fit. Here are a few:

"One who posts a deliberately provocative message to a newsgroup or message board with the intention of causing maximum disruption and argument."

Or

"One who purposely and deliberately (that purpose usually being self-amusement) starts an argument in a manner which attacks others on a forum without in any way listening to the arguments proposed by his or her peers. He will spark off such an argument via the use of ad hominem attacks (i.e. "you're nothing but a fanboy" is a popular phrase) with no substance or relevance to back them up as well as straw-man arguments, which he uses to simply avoid addressing the essence of the issue."

Or

"An angry monster who lives under a bridge, eats goats, and vents his rage on YouTube."

There are many more interesting takes on the definition, but we have a word limit to adhere to.

Today, it seems like the word troll is used by people to describe someone on the internet (real or anonymous) who seems to be deliberately trying to irritate people (others or yourself), in order to:
a) Just piss them (or you) off
b) Derail an otherwise serious discussion
c) Spread lies and confusion for fun

WHY?

Ah. Now that's the billion dollar question. There have been many explanations put forth on the internet for why trolls are the way they are, and apparently some of them have been by the trolls themselves...

Everything from small-penis-syndrome to mental disorders, and narcissism to sadism, almost everything that's wrong with the world can be blamed on internet trolls. To be honest, if you've ever been targeted by trolls, you know for a fact that you have caught yourself wishing that the troll's house would collapse in the middle of a family reunion, just so that the genetic lineage of the a$$hole is wiped clean. That's just rage speaking, however, and you know that there are times trolls can be fun too. This is especially true when you read some of the comments on popular videos – it's where the term "comment gold" comes from. There are times when trolls can be just plain hilarious.

We've all had those friends who, during diwali, put rockets into bottles and fire them sideways (parallel to the street), to make crowds of people jump and dive and do crazy things to get out of the firecracker's trajectory. Do they know it's dangerous? Sure. Do they care? Heck no! We think it's safe to assume that you certainly did enjoy seeing rockets fizz about everywhere, even though you had to duck or jump out of the way of a few yourself. It certainly got your heart pounding faster, and seemed very exciting. Would you do that yourself? (Assuming, of course, that you weren't the one who did such things). Probably not. There is, then, a case to be made for trolls certainly being exciting, or at least, entertaining.

TROLLING REDEFINED?

So do we have to stick with this assumption of being an internet "troll"? Was there no such thing as a troll in the pre-internet days? We have to concede that the usage of the word itself has only skyrocketed in internet times, and so, the now traditional usage of the word itself really does mean "internet troll". Strictly speaking, a "troll", in 2016 language, really is someone on the internet who does a wide range of things, which generally involve getting some people angry – the angrier the better, for the troll.

We will, however, overreach a bit, and try and broaden the definition of, let's call it "troll-like behaviour" and try and look at it from an evolutionary perspective, to figure out whether this is really a recent

Popularity of the word troll showing up in books over the past 300 years or so

flare-up of human behaviour, or whether there is more to it than meets the eye.

In a sense, this article essentially aims to trace troll-like behaviour backwards. We're no biologists, and we are certainly not evolutionary biologists. Thus we apologise in advance for using the terms "evolution" or "natural selection" in as loose ways in which those terms can be used. We are merely seeking to find a pattern (one which very possibly may exist only in our minds) through all of complicated life, in order to better try and understand this organism called a troll. Let's start with more recent and famous troll events and work our way backwards in time.

FAMOUS RECENT ACTS

Now here's where it gets insane. There are just so many examples on the internet of people being trolled, we don't even know where to begin.

Let's start with the group Anonymous. Perhaps the most famous yet anonymous group of all time, the hacker combine recently "fooled" Donald Trump, the Secret Service and the FBI, by claiming to have "hacked" Donald Trump's personal information, and then proceeded to post it publicly online. Now obviously this was considered a security threat and a

security breach, as currently Trump is the leading Republican candidate in the run up to the US presidential elections. However, all anonymous had really done was to collect information already in the public domain and repost it as hacked information. (Read more about it here: http://dgit.in/AnonDrumpf)

Actually, anonymous itself is set up to be a haven for trolls. This is because most trolls like to stay anonymous, and that's why the internet is the ideal place to do so, because it's really easy to keep your real identity hidden. So long as you don't break any laws, tracers like the IP address you use cannot be demanded by authorities or others from the services you're using online. This means that you can pretty much say anything you want online, and only risk getting banned, blocked or having your account terminated, which in today's day and age of free accounts, is no big loss. Thus, when someone claims to belong to the group Anonymous, you really cannot tell if they are or aren't, because by it's own definition, it's a decentralised group.

Not all trolls are malicious, or trying to cause trouble even. Another way of trolling someone is to feign ignorance, or purposely act stupid so as to get a laugh, and to cause some people to get frustrated. This kind of troll is perfectly fine with being laughed at, in fact, he/she counts on it. An example here is Kenneth McCarthy, a writer for Comedy Central. Kenneth (Ken M) actually started off on the internet like all of us. In an interview to Upvoted, he recounted how he used to leave sincere comments on news articles, but never received any rational replies. Without even knowing what trolling was, he started playing dumb, in his own way of pushing the boundaries of how stupid he could be in the comments and still get people to reply to him, and take him seriously. Soon, he was an internet sensation and had a fan following.

Even this writer was fooled once while writing a dmystify about nuclear weapons, where someone had inserted false information into a Wikipedia page, which was then picked up by a few smaller sites as a story of interest, and

A typical troll by Ken M, who is very popular these days

Wikipedia is especially prone to troll attacks because of the way the site works

then those very sites were provided as the citations for the information. Basically there was a scientist called Edward Teller, who is sometimes called "father of the hydrogen bomb" because of the designs he helped create for nuclear weapons. It just so happened that he was the right age to possibly be related to a magician called Teller (from Penn and Teller), and the Wikipedia page claimed Edward Teller was the father of the magician Teller. This was an edit made by a known vandal, and was later on changed, but it was information that was stuck in this writer's brain for a long time. Sadly, by the time the error was discovered, we'd already printed the book, and had to print a correction the next month. However, it was a prime example why Wikipedia cannot be trusted, and certainly, a lot of fact checking is needed for information posted online.

There are many more examples, but this is the one topic where you might have read a lot of articles before, and you can always Google to know more. What's not as common is perhaps looking at older examples of troll-like behaviour, which may or may not have been planned.

FAMOUS ANCIENT ACTS OF TROLLING

We are going to stretch the definition of troll-like behaviour for this, because, well, this is perhaps from where the inspiration for a lot of modern day trolls stems from. Let's look at that in the form of an example. Take the bronze age story of Troy, and even though it (supposedly) happened over 3,000 years ago, so many of us know all about the Trojan war. Heck, we even name certain types of malware "trojans" because they pretend to be something they're not (or contain malicious code in an otherwise harmless looking package). For over 3,000 years the story of the Trojan Horse has been told, about how a deception was able to win a war for the Greeks – and by inference is something to be celebrated. Although we can't say the Greeks trolled the Trojans, you do understand the point we're making here about how if you broaden the definition of trolling, you can see the same mental processes of deception being used, even in much more practical times.

A much more recent example of a deception was the telling of a story adapted from H.G. Wells' novel, War of the Worlds on the radio by Orson Welles

in 1938. The story of Martians attacking Earth, and the detail in which it was narrated, was said to have caused a mass panic. However, it wasn't the radio station, or even Orson Welles who was trolling, because it's now believed that actually there was no panic, and in fact the station which broadcast the episode had very few listeners to begin with. In an attempt to "troll", it was newspapers who hyped the event and made it seem like a million people were terrified and trembling at this radio prank. This is because radio was still new, and was stealing big bucks in advertising money away from the newspapers, and thus some newspapers thought it would be a good idea to hype the whole thing in order to discredit radio as a source for serious information. We leave judgements about whether the newspapers failed or succeeded to others, however, it was, as far as we can tell, a deliberate pre-internet era example of trolling.

Not all examples of such deviant behaviour are for fun. Some are devious and clearly for profit, though many would argue that profit alone cannot explain the deep desire of a person to try and fool people. It's also extremely pleasurable to be able to "pull one over" otherwise intelligent people, and to be able to fool experts is just got to be an incredible feeling for a troll.

A famous British art forger, Shaun Greenhalgh, who was most active from 1990 to 2005, is a prime example of someone being able to fool experts, in their own field of study. The most famous forgery was called the Armana Princess, which is a headless sculpture that Shaun whipped up in his shed in under three weeks, but his father was able to sell it by fooling multiple experts from the Bolton Museum, the British Museum and also famous auction house Christie's. The sculpture was bought by the Bolton Museum for a whopping 440,000 pounds (in 2003). When the family was caught, finally, these experts were left with egg on their faces.

Pierre de Fermat, the French lawyer and mathematician, once wrote a theorem

in the margin of a copy of Diophantus' Arithmetica, which was later known as "Fermat's last theorem". The theorem states, quite simply, that it is impossible to have $a^n + b^n = c^n$ for any value of n larger than 2. Thus, we know that 3 squared + 4 squared = 5 squared (which is basically the relation of the sides (measuring 3 and 4 units) of a right-angled triangle with its hypotenuse (measuring 5 units). In the margin he wrote the theorem, and added that he could prove it, but there wasn't enough space in the margin to do so. This, we believe, is the troll in Fermat rearing its ugly head, and tempting him to torture mathematicians for over 300 years!

This little sculpture was made in a shed, but still managed to fool art experts, and was sold for 440,000 pounds!

Although possible, because people from the 17th century seem to be pretty brilliant (Newton certainly was), we feel that Fermat was lying, deliberately. Perhaps the answer had frustrated him, and he decided to play a little mischief by leaving it as a mystery for thousands after him to try and solve. Over 350 years later, in 1995, British mathematician Andrew John Wiles (now knighted), finally cracked the problem using complex modern mathematical techniques that only a handful of people on Earth can really understand, in

a proof that takes up about 150 pages of a book, and took Wiles seven years to come up with! Fermat wasn't lying about one thing: 150 pages of modern math would certainly not fit in the margin of an old French text book!

We don't need to stick to classic history, we can also look at ancient mythology. Whether you believe mythology to be true events or man-made stories doesn't really matter to the context being provided here, because either way you will have to accept that the stories from mythology really do affect the humans of ancient times. Thus we have young Krishna, the naughty prankster, who is much loved by everyone, despite his naughtiness, because he does make people laugh. Norse mythology also contains a deity in the form of Loki, who is a shape-shifter and often fools even the gods in mythology with his powers of deception. History later made him mischievous, but he started out just deceptive.

We can assume, however, that there has always been a desire to be naughty, and fool people. As we mentioned earlier, it doesn't matter what you believe, because even if you believe that naughty deities exist, it still shows that "trolling" really has been around for a long, long time.

But is it a purely human trait?

IS THERE A TROLL GENE?

As we said at the start of this story, there is no way for us to ever have even a smidegeon of real genetics and evolutionary biology knowledge to allow us to comment on the subject, so please treat this as a wild thought experiment based only on conjecture, and not actual scientific fact.

In our thought experiment, given that genetics and epigenetics shows us new aspects of life that genes can control, and seemingly a lot of mental structure certainly seems genetic (or epigenetic), we feel it's plausible that even things such as comedy and trolling might be genetic in nature. There are just people we all know who are inherently funny, and have a comic timing and way of thinking that most of us can never even hope to emulate. Even with months or years of preparation, we'd never be able to make people laugh

the way these individuals can using only their wit. Thus, there's fundamentally something different in the way some people think. Perhaps we can go as far as to say that there are ways in which their brain just develops very differently.

There are many genetic markers that scientists are associating with differences or deficiencies in the brains of various people. It's why some people have autism, and as a result bad social skills, but can also have wild talents for some area that normal people just cannot fathom. Many claim that Einstein and Newton were probably autistic. What this means is that genes and gene expressions can affect the way our brains develop and function, and perhaps, just perhaps, could even control personality traits such as the ones trolls exhibit. If this is true, a troll might have no control over the desire to troll, and thus could be considered as helpless as you are about your skin colour – which, unless you're Michael Jackson, is something you will have to learn to accept.

DO ANIMALS TROLL?

There's another way to test for this thought experiment, and we should specify that it's not a truly scientific method as no actual genes are being sampled. If comedy, mischief and trolling really has a genetic origin, then it stands to reason that humans shouldn't be the only ones exhibiting this behaviour.

There are many examples in nature, and the most obvious one is the Cuckoo, who lays eggs in another species nest, so that all the headache of chick rearing and feeding is done by someone else. The human equivalent is having babies, being capable of caring for them, but leaving them on the doorsteps of good samaritans, so that you never have to take the trouble. Some species of cuckoo only breed in this way, while others are known to lay eggs in nests of others of their own species. What this amounts to, in essence, is a spreading of one's genetic offspring into many different nests, and thus increasing the chances of genetic survival. The fact that it's genetic is exhibited by the young bird when it hatches, as it hatches faster

than the foster parent's own eggs, and then proceeds to throw out the eggs (or smaller chicks if they hatch) in order to minimise the competition for food. This is done purely by instinct as the chick is too young to learn this behaviour. Thus, the cuckoo could possibly be an example of troll-like behaviour (in a broad definition) actually being an obvious evolutionary advantage!

Another mischievous creature we want to highlight here is the Scorpionfly. This weird insect does a lot of strange things in order to mate. The custom for the Scorpionfly mating ritual is for the male to bring the female a gift of food in order

Meet the scorpionfly – the lazy transvestite!

to make her more likely to mate with it. However, males don't always want to work hard to get the meal, and have been known to steal already dead insects from spider-webs, and also steal from other males. However, some of these little male insects take to trolling their counterparts, by pretending to be female, and waiting for some unsuspecting male to bring it food as an offering, which it accepts, and then goes off to find a female to offer the food to. We can only assume there have been a few times when a bunch of males exhibiting this transvestite behaviour just keep regifting food to one another because everyone's pretending to be female. Most

internet forums can draw a parallel here... trust us, there are no women on there, just some men pretending to be women in order to get attention and troll.

If we want to get closer to mankind genetically, there's always monkeys to look at. Anyone who's been to a tourist spot that has monkeys in India will testify to them being really mischievous – and not just with humans, but with other monkeys and other species as well. We've all seen monkeys harass cats, dogs, birds and humans, and they don't always do it for food. Sometimes a bored monkey will steal something inedible purely for fun –

ask the many tourists who didn't secure their cameras with straps, or didn't hold on to their hats!

WHY DO TROLLS STILL EXIST?

If we accept as a hypothesis that trolling (or purposefully mischievous behaviour) is something that's genetic, we then have to wonder why this has survived? What could the evolutionary advantage be for such behaviour to continue?

We think the first and foremost reason for this behaviour existing, especially in younger beings (children, teens, infants), is that it's not really trolling at all. In fact,

the best word to describe it is "play". How many of you have watched kids be "mean" to one another when playing? Of course the definition of mean is applied by adult (or more mature) standards here, so if you were to trip someone who is walking by you in a park, then proceed to jump on him/her playfully, pull their hair, throw sand in their face, then run away screaming in laughter, anyone witnessing this would certainly think you were quite an a$$hole! When toddlers do it, it's just "playing". This holds true for all species that we usually observe in domestic situations – kittens, puppies, chicks, foals, cubs...

In biologist terminology, play is something that animals do for fun when they're not stressed, not being hunted or in any other life and death scenario. Many animals can play alone too, because it seems to be a fun state of mind rather than necessitating an interaction with another. However, most popular play methods do involve siblings or other young ones, or even adults. Species can even inter-play, as kittens are often seen playing with puppies, for example. This is not only limited to youngsters, because young adults also exhibit this behaviour, and in fact in many species, this is an all through life method of having some fun.

So can we say that trolling is basically just another method of playing? Perhaps, but we certainly cannot prove it, merely point in that general direction. Perhaps some scientists will make it a study and get a grant to do so and answer that question someday (if some obscure study hasn't already done so).

COMEDY, SATIRE, ETC

When it comes to playing, trolling or basically having fun (often at another's expense), there are many more methods of getting a laugh. Although no concrete data that we could find, there are many suggestions that humour in general is an indicator of good genes.

Thus, think of it in terms of natural selection, and you might find a study or two that suggest that humour is a desirable trait for females when they are

Genetics dictates that only cats and human males are funny; females only need to giggle on command

ovulating. We think this is because wit and humour signify a mating ritual that's usually played out in the animal kingdom. Although there are exceptions to every rule, in general, the animal kingdom consists of males vying for the favours of females. In mammals, because females have to carry the pregnancy, this courtship is especially pronounced. Thus, males use more than looks (they also use humour and wit) to show that they have good genes. Studies have shown that although men and women can be as funny as one another, and one of the most common desired traits on dating sites is "Sense of humour", it applies very differently to the sexes. What women generally mean when they list that desire is that they want a man who can make them laugh, while men usually mean that they want a woman who will laugh at their jokes or silliness. According to the data collected, it's suggested that men don't necessarily want a woman who's funny, or wittier than them.

Whatever the case, geneticists and psychologists seem to believe that there is a clear evolutionary advantage to having the humour gene express itself prominently

in your DNA. The same applies to satire, slapstick comedy, and even trolling.

FEED THE TROLLS, THEY HAVE A PURPOSE

Since almost all trolls derive pleasure from trolling, we can conclude that they're essentially indulging in the animal behaviour of playing. The reason they persist is because we, the non-trolls, find it funny (at least in some instances), which encourages them to continue.

However, there certainly is another much more important case to be made for trolling. Yes perhaps such behaviour is in-built into many of us, and yes, perhaps there is a troll-gene that's actually beneficial for evolution... however, we think there are a few important aspects in which trolls (some, not all) play a vital role in society.

To start with, the trolls are usually always pushing on our limits of tolerance. It takes a person to blow up a few times and be affected by trolls before he or she starts developing thicker skin. One of the side effects of developing thicker skin is the willingness to listen to more

contrarian views without losing your cool. Thus, the journey that a troll starts you on with regards to some random discussion on the internet, could actually culminate in you being a more tolerant person – not just online either.

The anonymity of a lot of trolls are also the reason they're able to speak their mind openly, and often rudely. Now, of course, sometimes the troll attempts to sidetrack the conversation, or starts inserting fallacies, however, there are a few times when a troll will make a valid point, and speak out and say what many others may be thinking but be too polite to say out loud (type out loud?). This is obviously because their real identity is not at risk of being exposed.

Trolls are especially useful for pushing boundaries in any discussion regarding religion, or some other similar topic that usually offends people very quickly – nationalism is one hot example in India these days.

Even if you believe in none of the above reasons, you will have to admit that (when you're not the target) trolling can be a heck of a lot of fun. Why? Because no matter how civilised we think we are, we

People are often told not to feed the trolls (don't encourage them by replying)

love it when two of our own species decide it's time to have a good roll in the mud, hurting themselves. There's a reason why the Romans were able to entertain both men and women with the gladiator games – we humans are sick, and deep down, we really, really want to feed the trolls!

10 COMMANDMENTS TO TROLL A TROLL

SOMETIMES, NO MATTER WHAT YOU DO, YOU DO END UP FACING A TROLL ONLINE. IN SUCH A SCENARIO, HERE ARE 10 COMMANDMENTS THAT CAN HELP YOU GET THROUGH VICTORIOUS!

BY **ARNAB MUKHERJEE**

Be it the mace wielding, teeth gnashing types from your favorite fantasy universes, or the present day internet pests from the social media of your choice, if there is one thing that trolls have been consistent with, it has been irritation. A short break on your Facebook or Twitter account, or a quick look before you go to sleep, might soon spiral into a never ending tirade of to-and-fro between you and a troll, unless you know how to deal with them.

Dealing with a troll might not be as easy as it seems at the beginning. What feeds a troll are any reactions or hasty reactions from you that they can pounce upon to respond. So just make sure that you aren't "feeding the trolls". Once you are calm, quiet and can feel the inner peace, follow these 10 commandments to troll the troll at his own game.

1 THOU SHALT IDENTIFY

Before you take up metaphorical arms at the troll in your crosshairs, take a moment to figure out if the person is actually a troll. Sometimes a little patience reveals a troll to be nothing more than an actually frustrated person or someone who is just having a bad day. In such cases, a small wait usually knocks the wind out of their words and makes them see their fault themselves.

Jane Doe: *Got this reeeeelllly cuute teddy today!!*
Hereto Troll: *OMG why don't you just roll over and die?*

Jane Doe: *Hey...what's the matter...is everything ok?*
Hereto Troll: *....no....sorry.. Thanks for asking*

2 THOU SHALT CITE FACTS

Even if it costs you a few precious seconds in your time-sensitive duel against an online assailant, always cross-check the claims and statements they make for factual accuracy. Trolls are often too sure of themselves to verify what they know to be correct and in such cases, once you find their false basis, feel free to ask them to check their facts before they open their mouth next time.

Goodguy Gamer: *Finally Reached level 29 on ThatRandomGame!! Plasma gun - here I come!!*
Hereto Troll: *Lol Noob!! M on level 300 and blasting away with my ultra mega hyperdrive gun!! Just quit already!!*
Goodguy Gamer: *Umm.. Actually there is no level 300. There are only 50 levels. No such thing as ultra mega whatever.*
Hereto Troll logged out

3 THOU SHALT BE A GRAMMAR NAZI

The things you do for social media! Yes, even though grammar-nazism itself is a very irritating behavior online, it can be used against a troll with a lot of effectiveness. Although it does make your argument a bit weak sometimes, there is an unexplainable satisfaction in explaining that the conversation cannot continue due to lack of basic language processing capabilities!

Hereto Troll: *You lookin so damn ugly!!*
Herr Punctuator: *Not lookin.. *Looking*
Hereto Troll: *Whatchu tryin to say?*
Herr Punctuator: *I believe you meant "What are you trying to say?", which indeed is gradually becoming my question too.*
Hereto Troll: *Whatevs*
Herr Punctuator: **Whatever*
Hereto Troll:......

4 THOU SHALT DELETE COMMENTS

Carefully feed the trolls to illicit responses from them continuously, then once you are satisfied with the length of the conversation, do the following:

a. Delete every comment you made in the conversation
b. Take screenshots with the trolls comments being the only ones on the post
c. Delete the conversation itself so that the troll has no access to it.
d. Share the shots, lean back and get some popcorn

Cheapshot, do we hear you say? All's fair in anti-trolling!

5 THOU SHALT MAKE THEM STUMBLE UPON THEMSELVES

A troll, motivated solely by the dark pleasure of trolling, is not the kind of person who is consistent with their words. A few quick irritating taunts about delay in replies might even incite them to throw caution to

the wind and take your counter bait. At this point, you can actually feed them misinformation on their own statements and in almost all cases, they will agree without delay. Make no mistake, this is also the point where the troll might prove to actually be someone who knows their way around what they are talking about, so be careful and cross check their repertoire first.

Traveller: Just got the best beach package for 20k.
Hereto Troll: Dude!!! You got ripped. That package comes for 15k!!! I took it a few weeks back!!!
Traveller: oh!! Damn.. hey can you tell me what did you get in your package?
Hereto Troll: Sure! I got the beach hut, the parasailing, the ATV rides, breakfast, lunch, dinner, the fort tour with guide, the trekking and a few other tidbits.
Traveller: Wow, Sure sounds good. And how many days did you stay?
Hereto Troll: About 10 days.
Traveller: Ok. Is the cellphone connectivity good there?
Hereto Troll: Yeah, sure is.
Traveller: Ok. seems like you had fun on your 13k package to this amazing place. Glad to know that.
Hereto Troll: Yeah. Sure did, all that for just 13k. Too bad you got ripped off.
Traveller: But you just said the package was for 15k. And now you are saying it's 13k.
Hereto Troll: oh...wait..
Traveller: And I just checked. There is no fort in the entire town. It's just there on the postcards.
Hereto Troll: Ttyl Bye!!

THOU SHALT BE SERIOUS

Sometimes, all it takes to drive the wind out of a joke are a few serious faces pretending to not understand it. The same logic applies to the online activities of a troll, even the ones that are trying too hard to feed you misinformation. Tell them you believe them, in fact pretend that you are taking serious action based on the information they gave you, even after they have declared all of it to be a trolling attempt. Trust me, this one works like magic!

Hereto Troll: Hey!!
Sirius Sam: Yes?
Hereto Troll: I just used your credit card to buy myself a new car!!!
Sirius Sam: What the....??
Hereto Troll: LOL!! You just got trolled!!
Sirius Sam: So it was you!
Hereto Troll: What? What do you mean?
Sirius Sam: My card did get stolen and I just received a purchase message from NewCar Dealers this morning!

The Golden rule to out-troll a troll

Hereto Troll: What are you talking about man??? I told you I was just kidding with you!!!
Sirius Sam: Wait I'm calling the cops!
Hereto Troll is offline

THOU SHALT UPHOLD THE TRUTH

Contrary to what we might hope from it, the world, both online and offline, does have the ability to spot an idiot when their actions are out in the open. Irrespective of whether you are following any of the previous points or not - always keep evidence. A troll, especially a seasoned one, is always ready to remove all traces of their activities and pretend as if nothing happened. Before that can happen, take your screenshots and video captures. And when the time is right, hail the admins! Any online community usually has guidelines to follow and takes their violations seriously.

THOU SHALT FIND THE ENEMY OF YOUR ENEMY

A troll enjoys the game too much to stop after one successful trolling. Chances are, your troll has trolled someone earlier and is probably trolling multiple people when you got trolled. Talk to the others who have been victims of your troll's activities. Once you are ready with a plan, lay the trap, gather the numbers, and wait for the troll to walk right into your hungry, bloodthirsty crowd. Once he's in and trolling – Charge!

Jane Doe: I just got another reeeeeeellllllyyyy cuuutee teddyy!!
Hereto Troll: Again!!!!! You just proved you are fulllllll reetarded!!! This one's even lamer!!
Jane Doe: Hey.. It's you again! Didn't you ever have a favorite soft toy?
Hereto Troll: Nope!! My favorite toy was a limited edition Ultra Ninja Swordmaster figurine.
Goodguy Gamer: I believe there are only 3 of those, and currently all three are with the International Game Museum.
Hereto Troll: What? What are you doin here?
Herr Punctuator: *doing
Hereto Troll: What the...
Traveller: So did you get the figurine for 15k or 13k? :P
Hereto Troll: Damn you all! M gonna kill you all!
Sirius Sam: Don't worry guys. Police is on its way to his place.
Hereto Troll deactivated account

THOU SHALT RELY ON SHADOWBANNING

Several online communities have mechanisms in place to ban a troll/harmful person in such a way that their comments are only visible to themselves. That way, they don't get to figure out that they are banned until quite a while, and once they do, there's pretty much nothing they can do about it. Consider this the conceptual opposite of doxxing, where you actually reveal the identity of an anonymous person, here

GOOD GUY INTERNET

Internet and Social Media have not only become an integral part of our lives, in many aspects they have replaced parts of our lives completely and become a living breathing society in themselves. For instance, in the past 5 years, we have seen Oxford dictionary award Word Of the Year (WOTY) to words like Selfie and Unfriend. In fact, last year the Oxford WOTY was an emoji - the laughing face with tears. Also, there is an increasing call everyday to regulate the online world with stricter laws where earlier there were none. All of this implies that while living online, you need to keep in mind that it is not too different than an offline world and often the same rules and manners are expected to be followed. If you still can't wrap your head around this idea, here's a short dos and don'ts to get you started on being an internet good guy:

DOs

1. **Use proper privacy settings on each and every website you have an account on -** Privacy settings in the online world are all that stand between your online social life and a complete stranger.

2. **Control your temper -** Even if someone, particularly a troll, is trying to provoke you a lot, hold onto your anger and ignore the same. Venting out online will always be counterproductive and might even land you in trouble.

3. **Verify Information -** Before you endorse any information online, like sharing, retweeting or quoting someone on a forum, always double check it for validity. There is no dearth of misinformation online.

4. **Encourage newcomers -** If you find someone who is new to the online world and makes a lot of mistakes, instead of ridiculing them try to help them out.

5. **Keep your online and offline life separated -** Might be the most difficult instruction here, but it is undeniable that real life is way more important than virtual.

DONTs

1. **Don't share your personal details online -** This cannot be stressed enough. Everything from your birthdate to your school's name can be used to either harm you in real life or compromise any of your accounts that uses that information.

2. **Don't share something against the current organization you are employed with -** Most organisations now have dedicated social media departments and it doesn't take much to track such a post down.

3. **Don't copy paste things as your own -** Plagiarism is illegal and a punishable offence and there are tools now to detect its occurrence.

4. **Don't do anything suspicious -** Similar to how you treat strangers in real life, don't open emails from unknown sources or open websites that look suspicious.

5. **And Lastly, Don't over-troll -** A few jokes are funny, but no-one wants to be constantly

It truly is easier to remember the names of all your relatives than all your friends!

hounded and always be at the butt of jokes. Don't over-troll anyone and stop when it's not funny anymore.

Special Mention: Use your common sense - We know it might be a rare resource to expect from others nowadays, but that shouldn't stop you from putting it to use. Most of the time, the action that makes the most sense is the right thing to do, both online and offline. Hold this golden rule at the tip of your fingers.

the troll, online so that they behave with more accountability.

10 THOU SHALT BE FUNNY

The ultimate weapon against any and every form of troll, online or offline, is your own ability to find humor in their actions and turn it against them. A good sense of humor combined with a presence of mind can let you feel a sense of satisfaction that even the most brutal revenge can't.

Social Guru: I believe everybody should be given equal opportunity regardless of race, caste, gender and nationality.
Hereto Troll: Oh so you are saying that X people deserve privileges? Have you forgotten ABCD event? Just stop being a bootlicker!!

Social Guru: Good piece of advice. Boots don't taste good either I've heard. Thanks for sharing your valuable experience with me.
Hereto Troll: Don't you get cocky with me! God is watching. He will definitely punish you. I'll see what you do when judgement day comes!
Social Guru: I'll tell you - taking down Skynet!

Tried & Tested

Feature
64 We test the claims put forward by several memory cleaning apps to tell you the facts regarding how they work

Bazaar
66 All the latest and greatest products tested and reviewed so you make an informed buying decision

BEYOND

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They say smartwatches are the next big thing. In our tests though, we've usually found these devices to lack the all-round functionality to really be recommended.

That said, smartwatches have come a long way since their debut; enough to make sense for more than just early adopters. There are popular names, from the biggest technology giants, and things are starting to change.

Many took interest in smartwatches after the Apple Watch was announced, while others look to the Moto 360 as the best. Over the past few months, we too have tinkered with many of these devices and there are quite a few options available in the market.

MOTO 360 (2ND GEN)

Perhaps the best known smartwatch in the market today, Motorola was the first company to introduce the round dial on a smartwatch. That said, the first gen Moto 360 still had a way to go, and the company has improved with this second version. The Snapdragon 400 SoC on the device is much faster and the Moto 360 (2nd Gen) is much more responsive than the original. It's faster and more fluid.

It is available in 46mm and 42mm sizes and is just a hair thinner than its predecessor. While the stainless steel casing on the Moto 360 (2nd Gen) is similar to its predecessor, the new versions looks more mature. The power on/off button has been moved to the 2'o'clock position and the straps can now be removed by any watch maker. The addition of a metal clasp has also made the watch look better.

While looks are subjective, what's really worth appreciating is the 233ppi pixel density on the new Moto 360. It makes the display quite crisp and almost eliminates the screen-door effect that was prevalent on the original version. The display is also quite bright and has good touch feedback.

From a performance point of view, the Moto 360 was the fastest to respond to calls and supports a variety of apps,

rivaled only by Apple's Watch OS. It rarely fails to turn the display on when you raise your hand to check a notification or to see the time, and it's amongst the more accurate smartwatches in the market today. There are also a number of watch faces to choose from.

It costs ₹19,999 though, which puts it amongst the more affordable smartwatches in the market right now. That said, Android Wear OS isn't very intuitive. The primary mode of interaction with Android Wear is voice, which is difficult, especially when you're in noisy outdoor conditions. Even

indoors, where the voice recognition works fine, it isn't the fastest way to interact, when compared with Apple's crown or Samsung's rotatable dial.

ASUS ZENWATCH 2
Perhaps the cheapest and most value for money smartwatch in the market today, the ASUS Zenwatch 2 is like square dial counterpart to the Moto 360 (2nd Gen). It runs the Android Wear OS, meaning it has some of the same strengths and weaknesses. In addition, the two devices run on the same Snapdragon 400 SoC, and are just as responsive.

The Zenwatch 2 is amongst the few square dial smartwatches running Android Wear and it looks quite good. The stainless steel design is nice, but the thick bezels hamper the overall design. In addition, it has plastic on the back, which is a major downer as well.

The Zenwatch weighs 60 grams, making it the heaviest in this comparison, but the weight really isn't a big issue. However, while the watch is IP67 certified, we would advise you to keep the leather straps away from water.

The 278 ppi pixel density of the Asus Zenwatch 2 is not

as high as the Apple Watch or Samsung Gear S2, but it's just about enough. It is worth noting that we used the Asus Zenwatch 2 WI501Q, and there is another variants to this device, which has a slightly smaller display. The WI501Q has a 1.63inch display, while the other lies at 1.45 inch.

The performance of the Zenwatch 2 is generally beyond question, except the fact that its display refuses to turn on automatically sometimes.

Where the Asus Zenwatch 2 makes all its money though is its battery life. The watch lasts for a full two days and can go

WE COMPARE THE BEST SMARTWATCHES FROM APPLE, ASUS, MOTOROLA, PEBBLE AND SAMSUNG TO TELL YOU WHICH ONE DESERVES TO BE TICKING ON YOUR WRIST

A LITTLE MORE TRADTITIONAL

The growth of the smartwatch market has been noticed by traditional watchmakers recently. But while tech giants have usually focused on the smart part, these watchmakers focus more on the watch part of these devices. They do still fall under the same category though and may appeal to many people.

Titan Juxt

The Titan Juxt is easily the best looking smartwatch in the market today. It's an analogue device, which has a small display for smart features. It's not the most functional as a smartwatch, but those who care to have a smartwatch that looks like an analogue watch, this would be the perfect pick. It costs nearly ₹20,000 though, so it does fall in the premium watch segment at least.

The Titan Juxt isn't the best when it comes to taking calls or responding to, or even reading text messages. It has a high quality leather strap, which can be changed in Titan stores.

Timex Metropolitan+

If you simply want an analogue watch that also has some smart features and doesn't cost you an entire month's salary, then this is the one to consider. The Timex Metropolitan+ is an activity tracker, and an analogue smartwatch. It costs about ₹10,000 and has changeable straps, which can be changed by any watch-maker.

Personally, we're not big fans of this watch's looks, but as we've said time and again, looks are subjective.

Pebble Time

on a tad longer. While it's not ideal, amongst Android Wear smartwatches, it's the best. It beats the Moto 360 by a full day. In addition, the number of customisations possible on the Zenwatch 2 also add points in its favour.

The Asus Zenwatch 2 costs ₹11,999, making it the cheapest Android Wear smartwatch that you can buy at the moment. While it compromises on the heart rate sensor, its step tracking abilities

PEBBLE TIME

The Pebble Time is easily the most intriguing smartwatch in the market today. It's e-paper display solves a very big problem in smartwatches, that of battery life. Of all the smartwatches that get the 'smart' part right, the Pebble Time is the only one that can last for a full

7 days. It carries a square-ish design, like the Asus Zenwatch 2 and Apple Watch, but is much lighter than most of them.

In fact, the build and design of the Pebble Time is quite simplistic. It has a stainless steel body, but feels quite plasticky and looks very much like a toy, even more so because of the colour e-paper display. That said, many have appreciated the looks and design of the Pebble Time and simplistic would be the best way to define it. The watch is extremely light, at 42.5 grams, and quite resistant to scratches as well. In fact, many would even say that the Pebble Time has an elegant design, even if very simplistic.

Unlike Android Wear, Apple's WatchOS or Samsung's Tizen though, the Pebble OS that runs on the

Pebble Time depends on physical buttons for navigation on the watch. This is a major hindrance to using the Pebble Watch effectively. Its buttons are tough to press, especially when you're wearing it, and four buttons on such a small device give it a pretty steep learning curve. The Pebble Time has three buttons on the right, while there's also a home button on the left of the device.

Since the display isn't touch sensitive, you will be stuck pressing the buttons whenever you need to read a text or change the settings.

The Pebble Time's development has also been faster than what many would have expected. Pebble OS supports most of the important apps today, like Evernote, WhatsApp and more, and the watch is really responsive in terms of

Apple Watch

Fashion meets technology
Jackets by Paul&Shark have pockets lined with stainless
steel fibres that create a protective shield against
electromagnetic waves **http://dgit.in/PSEMWS**

Ireland human history
New discoveries suggest human presence
on the island from as far back as 12000 B.C
http://dgit.in/IrishMan   **Smartwatches**

HOW WE TESTED

Testing smartwatches can be tricky. It's one thing to compare looks and design, but that may differ from person to person. What you think looks good, may not be the same as what we think. Nevertheless, the looks for a smartwatch does play a very big role in its success. After all, there is a big fashion play here.

There is more to it though. A smartwatch also wants to be your fitness tracker, which means that accuracy is of paramount importance. We tested the tracking capabilities of each of these devices.

Then again, smartwatches also have some similarities with phones. Things like processor speed, RAM, pixel density of their displays, were also considered. Waterproofing is an important elements, which means an a watch that is completely waterproof will be more useful than one that is only water resistant. Add to that the weight of each watch. All these features were taken into consideration.

For performance, we tested the time each smartwatch took to display notifications. Some took a few seconds too long to detect calls and texts, which is often the difference between pulling your phone out of the pocket and using your smartwatch to respond. Also, while Apple's Watch OS works well with iOS, Google's Android Wear is also designed to be in sync with Android. In future, this could be a problem for operating systems like Tizen and Pebble OS, which have to walk the extra mile in order to achieve the same speed and fluidity. Speaking of which, the intuitiveness of the OS was also noted, along with the ecosystem it tries to provide for added functionality.

Lastly, having reviewed all of these smartwatches and used them ourselves, we had a good sense of how long their batteries last. However, for a more objective approach, we made equal number of calls and text messages to each of these and noted the battery drop. Few smartwatches can boast battery life of over a day and a half today, which is something that companies really need to solve.

With all this done, the price element was brought into play, in order to identify which watch made for the best value for money and bag our Best Buy award.

Our selections were the most talked about smartwatches today, which made for a great battle. We had the Apple Watch, Samsung Gear S2, Moto 360 (2nd Gen), Asus Zenwatch 2 and the Pebble Time.

how fast it responds to calls or texts that you receive.

There's an interesting note here, while Android Wear and WatchOS devices respond faster to native Android apps, like Google Messenger etc, they're slower in responding to texts on WhatsApp and other third party apps. The Pebble Time however, takes the same time to respond to all applications that it supports.

The problem with the Pebble Time is that it costs nearly ₹20,000, which is a lot considering it's other problems. The lack of intuitiveness, a heart rate sensor and the inaccuracy in steps-tracking are major inhibitors for it. While the Pebble Time definitely has potential, there's still more to do for the company.

APPLE WATCH

An interesting thing happened while writing down this comparison. On the day we sat down to write this, Apple decided to drop the price of the Apple Watch in the US. It currently costs about $300 there, but unfortunately, at the time of print, the India pricing was still upwards of ₹40,000.

Now the Apple Watch played an interesting role here. On the one hand, the device has a really premium metal build, but our judgements on its design are divided. So, we'll leave the decision of whether the Apple Watch really looks good, to you.

The redeeming qualities of the Apple Watch though, like firstly in its display. It has a 1.65 inch display, with an incredible 303 ppi pixel density. Barring the Samsung Gear S2, the Apple Watch may very well have the highest pixel density amongst smartwatches today. In addition, like most Apple displays, this one also looks very good.

But while the Apple Watch has a really good display, its other features and performance barely justify the price. For one, like most Apple devices in the past, this one also can't go past a full day's battery life. In fact, even that depends on how many notifications you usu-

ally get. In addition, Apple's Watch OS isn't the most intuitive either. It tries to replicate iOS in some ways, while adding the crown has made it easier to navigate than many other smartwatches.

Having said that, the crown still isn't the best way to navigate and there are places where the Apple Watch just isn't the best in the market. The good part is that there are quite a few apps to use with it, but like most other smartwatches, they're not the most useful. In addition, while the Apple Watch isn't completely accurate in tracking your steps, in our tests it turned out to be the most accurate amongst these competitors.

It also works only with iPhones, meaning it makes no sense unless you own Apple's premiere device. SO, all things

Samsung Gear S2

	Samsung Gear S2	Apple Watch	ASUS Zenwatch 2	Pebble Time	Moto 360 (2nd Gen)
Price	₹24,399	₹44,000	₹11,999	₹19,500	₹18,499
Performance Final Scores	14.6	12.6	12.8	8.2	17.6
Features Final Scores	14.8	13.7	13.8	12.3	13.7
Platform Final Scores	16.6	15.6	13	12.2	13
Design Final Scores	21.5	22.25	23.4	19.9	22.8
Overall Rating	67.7	64.2	63.1	52.7	67.1
Specifications					
Processor Cores	2	1	4	1	4
RAM	512	512	512	512	512
Display Size	1.2	1.65	1.63	1.25	1.56
Display Pixel Density	320	303	278	182	233
Shape	Round	Square	Square	Square	Round
Battery (in mAh)	250	250	400	150	400
Operating System	Tizen	Watch OS	Android Wear	Pebble OS	Android Wear
Performance					
Time taken to display messages (in seconds)	1.122	1.29	2.15	2.682	2.506
Time taken to display calls (in seconds)	1.51	2.18	0.86	1.67	0.2
Intuitiveness of UI	5	3	3	3	3
Number of gestures available	1	1	4	1	4
Display Auto Turn On	10	9	6	2	9
Step Tracking Accuracy (percent accuracy)	70.1	88.2	70	75	77.5
Heart Rate Tracking Accuracy (percent aberration)	18	22	0	0	14
Battery Life (In Hours)	36	24	48	168	27
Design					
Looks (out of 5)	3.5	4	4	3	4
Sizes Available (number of sizes)	2	2	2	1	2
Platform					
Operating System (out of 5)	4	5	5	4	5
Mode of Reply for Emails/Texts	1	1	1	1	1
Mode of Reply for Calls	0.5	1	0.5	0.5	0.5
Keyboard Quality	1	0	0	0	0
How intuitive is the OS?	4	3	2	2	2
Features					
Weight	48 gm	50 gm	60 gm	42.5 gm	50 gm
On/Off Buttons	1	1	1	1	1
Navigation Buttons/Dial/Crown	2	2	0	1	0
Changeable Straps	1	1	1	1	1
Waterproofing	2	0	1	1	1
Storage	4 GB	8 GB	4 GB	0.015 GB	4 GB

considered, while the Apple Watch may be amongst the better smartwatches in the market right now, it's far from the best.

SAMSUNG GEAR S2

The Samsung Gear S2 is easily the most intuitive smartwatch in the market today. In fact, we like this watch more than any other, simply because of that intuitiveness, which is all thanks to the rotatable dial. It makes for a near perfect way to navigate around a smartwatch, and of all the OSs and watches that we compared, this is the only one that actually made us want to read emails and long text messages on the watch. It also costs ₹24,300, which is a good price, but more than watches like the Moto 360 (2nd Gen).

In fact, while Samsung's Tizen OS comes out to be this watch's downfall, the South Korean giant has done a very good job with it. The reason the Gear S2 takes a split second more than the Moto 360 to respond to calls and notifications, is a result of the disconnect between Android/iOS and Tizen. It is the same reason why Pebble OS is slower. That said, the Gear S2 also has the same advantage as the Pebble Time, in that, it responds to all notifications equally. But then again, the app support needs to increase for this to really be the best smartwatch in the market. There aren't many watch faces to choose from, but the fact that you can put your own pictures on the watch face is good. The Samsung Gear S2 has a lot of redeeming qualities, but it needs a little more work to truly be the best smartwatch in the market.

The Samsung Gear S2 is the lightest after the Pebble Time, but though it has a metal body, it isn't the best looking smartwatch, in our opinion. The watch has changeable straps, but it's not as easy to do that as in the Moto 360 and ASUS Zenwatch 2.

It offers longer battery life than the Moto 360 (2nd Gen) and Apple Watch, but not as long as the ASUS Zenwatch 2. Of course, that automatically means it lasts for a much shorter duration than the Pebble Time smartwatch.

All in all, while the Samsung Gear S2 is amongst our favourite smartwatches in the market today, it falls just short of being the best performer right now. It may be the best when it comes to making smartwatches better though. While all others are either first generation products, or slightly improved versions of their originals, the Samsung Gear S2 has added something really meaningful to smartwatches and put Samsung firmly on the map in this market.

BEST BUY:
ASUS Zenwatch 2

As mentioned before, at ₹11,999, the ASUS Zenwatch 2 is the most value for money smartwatch today. While there is room for improvement, if you're looking to get a taste of what smartwatches can offer, this is the one to go for. Android Wear runs smoothly on the device and it is highly customisable, perhaps the most customisable of the lot.

ASUS needs to work on the design by reducing the thickness of the watch's bezels, and perhaps even make the whole body out of metal. The Zenwatch 2 is still one of the better looking smartwatches in the market.

If you're planning to buy a smartwatch and can't decide which one to buy, the ASUS Zenwatch 2 would be the ideal choice. It allows you to understand what a smartwatch can do and being a second generation device, it is greatly improved from the original. The ASUS Zenwatch Manager is also amongst the better bridging apps, with which

Moto 360 (2nd Gen)

you can control and customise the smartwatch.

BEST PERFORMER:
Moto 360 (2nd Gen)

When the first Moto 360 smartwatch was announced, it was widely proclaimed the best smartwatch in the market. So, it doesn't come as a big surprise that the second generation version has come to be the best performer this time. The Moto 360 (2nd Gen) was the fastest to respond to calls and texts, while its battery life lies in what can be considered the industry standard today. The Moto 360 (2nd Gen) is also widely benefited from the fact that Android Wear is meant to work well with Android devices.

The Moto 360 (2nd Gen) is also the best looking amongst smartwatches, at least in our opinion. It is well built and looks premium. Even though there aren't huge design changes, Motorola has refined the design this time, making the Moto 360 (2nd Gen) everything it needs to be, in terms of looks and build. If Google can make progress with Android Wear

fast enough, that'll do the Moto 360 (2nd Gen) a world of good.

It has a big enough display and the pixel density is also quite high.

EDITOR'S PICK:
Samsung Gear S2

Numbers play a big role in comparison, which is why the Samsung Gear S2 couldn't take the best performer titled in this comparison. While the smartwatch is indeed slower to receive notifications than the Moto 360, a split second's difference barely makes that big of a difference. The Gear S2's rotatable dial more than makes up for this, and it is very easy to use this smartwatch.

As we mentioned before, the smartwatch is the only one that we really felt like using. Yes, we would be glad if Samsung could add support for more applications, like Pebble OS and Apple's Watch OS, but it's a very good start.

It is a tad expensive, but at this nascent stage, it makes much more sense than buying an Apple Watch or an LG Watch Urbane.

ASUS Zenwatch 2

DO MEMORY CLEANING APPS REALLY WORK?
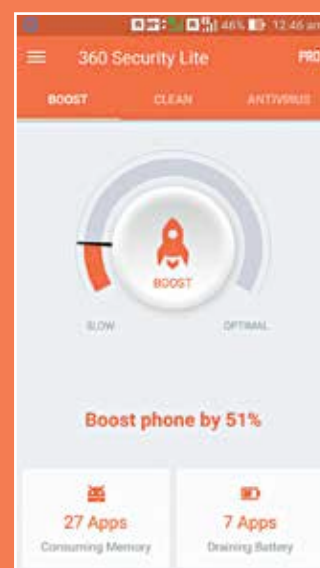
We put them to the test

Memory cleaning apps suddenly seem to have become the messiah for low to mid-range phones under the vicious grip of stutters and lags. We took the most popular cleaning apps out there and put their claims to test.

Clean Master Boost screen is nice and clean to look at

The DU Booster app is all about information and additional tools

360 Security Lite has a minimalistic interface, not overwhelming at all

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Not every smartphone comes with a truckload of RAM and a flagship level processor. The budget phone market now contains a lot of phones which, although perform brilliantly at their price point, often need a little bit of nudging and pushing to overcome certain limitations. And there are a number of services which market themselves as the tools you need for that nudging. One such type of apps are the memory cleaning apps. It has become a common sight to see people tapping away at "Boost" or "Speed up" buttons and widgets on their phones to get rid of those irritating stutters and lags on phones. Most of us are unknown to the risk that sometimes accompanies such apps that interact with the CPU processes. There have been cases where using such an app has caused a lot of bugs to show up on the phone and even caused the phone to be stuck in an infinite loop of cleaning, which could not be resolved without dire measures. We put such apps to test to figure out: Do memory cleaning apps really make your phone faster?

Now, before we start, let us tell you a bit about the methodology we followed with this. We benchmarked the phone on CPU and RAM usage right after restarting it, when the number of processes on memory are the bare minimum, and also after launching four memory hungry games and apps, where the memory is being taxed and apps are being offloaded from memory on opening any new app. Taking these two benchmarks, we compared them against a benchmark taken right after cleaning the memory using a third party cleaner app. Once this is done, the phone is restarted and the test

is repeated with another app. Here's how they fared.
Standard AnTuTu score - 16,917
Load AnTuTu score - 16,696

• **CleanMaster**
Our first test was done on the highly acclaimed, highly rated CleanMaster (Boost and Applock). Apart from the Phone Boost feature, CleanMaster has a ton of additional features including the more popular junk cleaning feature and takes into account both the internal as well as external memory when it analyses your storage problem. Compared to manual cleaning, CleanMaster did give some marginally better results on benchmarks, with better numbers for both the CPU Usage as well as the RAM usage.
Post Cleaning Score - 17,181

• **DU Booster**
Another highly used app for this purpose is the DU Speed Booster and Antivirus. With more than 100 million downloads and an average rating of 4.5, DU Booster set expectations high to begin with. The app itself offered a lot more features than CleanMaster, including the dedicated Game Booster, App Optimizer and App monitor. On being tested with the benchmarks after using a host of these cleaning and optimizing features in no particular order, DU Booster actually posted barely better numbers than CleanMaster.
Post Cleaning Score - 17,231

• **360 Security Lite**
Of all the apps we tested, this one was the fastest on its own, with a minimalistic material design oriented interface. Not to mention that it also comes with an antivirus feature that scans your system for viruses and spyware. The "Boost" feature works in a pretty standard way and we got similar performance compared to the other apps.
Post Cleaning Score - 17,164

At this point, we decided to take a call. The memory cleaning apps do seem to improve the performance of the phone marginally, or even significantly in some cases, but none of them was able to show any major difference or change than basic

system functions. The reason behind that can be understood in the basic concepts of memory management on any kind of computing device. Whenever a program is launched, it is loaded from the secondary storage (Internal or external) into the RAM with the CPU executing code from it with fast access. Now, whenever the RAM is filled with such programs, the performance becomes heavily dependent on two factors:
• The Ability of the CPU to multitask - multithreading and core management
• The availability of RAM to load any new program launched.
The former directly depends on the specification of the phone and can be overcome with a better configuration. The latter is what is dealt with, somewhat in a brute force method, by these memory cleaning apps. Once the "Boost" button is hit, the application drops each and every non-critical process from the RAM without dropping it from the recently used apps list. That is why in some cases, even after boosting, the apps were loaded back into memory and there was a RAM shortage not long after. Here lies the crux of how these memory management apps work.
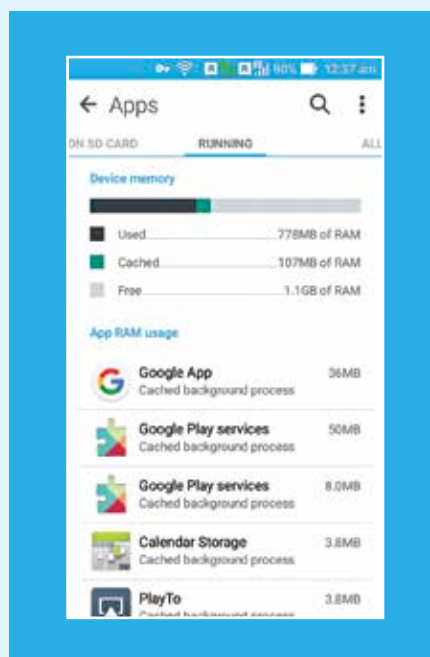
The running page under apps in standard Android settings is informative enough to find out which app is the major culprit for RAM unavailability

The elaborate trick
Since, Android is based on Linux, memory is never really free here, and if it is, it's a bad sign. The way memory management is handled in Android is like this -
1. There are certain programs in the memory that the CPU accesses (since they were put there because there isn't enough memory in the CPU in the first place. RAM is fast, remember?)
2. When a new program is loaded, the CPU asks the existing processes to drop out of memory one by one until there is enough RAM for it.
3. Memory management apps take advantage of this fact by creating a process that keeps requesting additional RAM till all the processes that can be dropped, have been dropped.
It then relinquishes that RAM.
Why this does not work, is the same reason why squeezing a sponge while it is on a wet surface doesn't make it dry in the long run. The apps that have been dropped from memory do come back in again once the free memory is relinquished and you are back to square one. Moreover, your CPU and battery have been taxed for the same. In fact, with current versions of Android, it is good to let apps stay in your memory so that they launch faster the next time you launch them. And relaunching them again and again actually consumes more battery and resources.
Operating Systems like Android and iOS come with in-built support for memory management, and if you navigate to Settings->Apps->Running you can actually see whatever information the cleaning apps show you in an Android system interface.

In Conclusion
Most Android UIs nowadays come with a memory cleaning shortcut or button inbuilt into it, maybe in the Action Screen or as a bloatware. And these do the exact basic task that you mostly will be doing on a memory cleaning app. So we can conclude that the memory cleaning apps, although working, are unnecessary.
Although, if you do intend to go with one, choose the lightest ones like Clean Master Lite and other Lite alternatives of standard apps.

Bazaar

THE LATEST PRODUCTS REVIEWED FOR YOU

The Digit Test Centre receives hundreds of products every month. Each of these products is put through a series of tests and is finally given a score. The final score is arrived at after considering a number of factors and evaluating them in terms of features, performance, value for money, build quality, and, in the case of software, even ease of use.

For better understanding of our ratings, here's a quick guide to our overall score

10 to 30 — Extremely poor product.
Keep away!

31 to 50 — Strictly OK.
Not recommended

51 to 70 — Decent product.
Go for it, but there may be better products out there.

71 to 90 — Very good product.
Highly recommended.

91 to 100 — Ground-breaking product.
We've never seen anything like it before.
A definite must buy!

INTERACTIVE REVIEWS INSIDE!
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Lenovo Yoga 900
An attractive premium convertible laptop

The Yoga 900 is the elite consumer hybrid notebook from Lenovo. It has a pristine brushed metal surface on its screen cover and a champagne gold colour that catches the eye instantly at a glance. It looks and feels premium on touch, no doubt. Its faux leather keyboard deck is especially impressive.

And the single biggest build quality aspect that stands out on the device is the wristband hinge, which Lenovo claims has been improved over the Yoga 3 Pro. The unique wristband hinge does perform admirably not only while fusing together the Yoga 900's screen and keyboard sections but also while using the hybrid notebook in a variety of positions – tent, tablet, etc. The base panel of the Yoga 900 has camouflaged rubber stopper which does a great job of anchoring the hybrid device on a glass, wooden or metal surface.

Compared to HP's flagship 2-in-1 hybrid device, HP Spectre x360, the Lenovo Yoga 900 is lighter, smaller and thinner in comparison. As far as hybrids go, the Yoga 900 definitely is one of the best built 2-in-1 laptops out there. Having said that, as with all 13-inch hybrids out there, holding this one as a tablet in one hand is uncomfortable.

Price ₹1,23,690

Performance
One of the Yoga 900's assets is its promising display. Measuring 13.3-inch and sporting a QHD+ 3200x1800 screen resolution, not to mention a glossy surface, the Lenovo Yoga 900's screen is one of the best ones we've seen this year. It's very bright, coming very close to its advertised 300 nits output – we measured it to be at 293.4 nits, which is again higher than the HP Spectre x360's screen brightness of 278.8 nits. The screen's extremely responsive when it's in tablet mode, with all the multitouch gestures and flicks working like a charm – no problems whatsoever. The only thing you'd have to get used to is working on a 13-inch tablet while it's placed on your lap. And the fact that the Yoga 900's glossy screen can be a fingerprint magnet.

Movies definitely come alive, music not so much, as we found the Yoga 900's audio experience to be slightly lacking on the bass front and the overall audio experience is definitely clearer.

As far as keyboard and touchpad goes, the slightly curved keys are pretty good to type on but their significantly shorter travel (or dip) is something you may need getting used to. We aren't great fans of the shortened right Shift key, but that's about the only other minor issue with the Lenovo Yoga 900's keyboard. The trackpad is clearly demarcated from the rest of the palmrest deck and sits slightly below its plane.

While the convertible laptop stayed unusually cool at CPU and hard disk temperatures of 40 degrees and 34 degrees celsius, respectively. As long as you multitask with day-to-day apps and multimedia tasks, the Yoga 900 should run just fine and at remarkably lower temps at that.

As far as benchmarks go, the Lenovo Yoga 900 performed better than both the HP Spectre x360 and Lenovo Yoga 314 (last year's best performing convertible laptop) in PC Mark (thanks to its 6th generation Intel Core i7-6500U processor) while it trailed narrowly in the 3D Mark and other graphics benchmarks. In our high performance battery test, the Yoga 900 lasted for 214 minutes as opposed to the HP Spectre x360's 212 minutes and Yoga 314's 273 minutes. Realistically, on a conservative power plan, expect the Yoga 900 to last around the 6 hour mark, not more, which is quite good given its high-powered hardware configuration but lesser in comparison to its claim of 9 hours.

Conclusion
Overall, the Lenovo Yoga 900 is one of the best and slimmest, 2-in-1 hybrid ultraportable money can buy. It's definitely one of the best convertible notebook's we've reviewed so far this year. The hybrid device is recommended for both business professionals and high-end consumers who want a unique product to play with it.

Jayesh Shinde

Interactive review

81
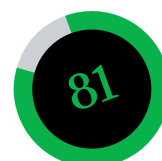
Features	77
Performance	83
Design	90
Value	75

Specifications
Colour: Champagne gold; **Screen:** 13.3-inch, QHD+ IPS multitouch display, 3200x1800 res; **CPU:** Intel Core i7-6500U 2.4-GHz processor; **RAM:** 8GB DDRIII; **Storage:** 512GB SSD; **GPU:** Intel HD Graphics; **OS:** 64-bit Windows 10; **I/O:** 2xUSB 3.0, 1xUSB 2.0 (DC in), 1xUSB Type-C, SD Card reader, 1 x Headphone jack; **Wireless:** Wi-Fi 802.11ac, Bluetooth 4.0; **Battery:** 4-cell; **Weight:** 1.3 kg; **Warranty:** 3 years

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Exynos Octa 7870 launched
Samsung starts using its 14nm process on cheaper
mobile processors, unveils 8-core Exynos Octa 7870
http://dgit.in/14nmEXyP

Gender bias
The gender bias is too visible in Blue Origin's recent
event as only two space reporters were female.
http://dgit.in/BlueGender

LeEco Le Max
LeEco's way

With its 6.33 inch display, the LeEco Le Max is one of the largest and most unweildy smartphones in the market right now. Even so, the thin bezels keep the size in check, ensuring that there's still some ergonomic value in the device. It gives the phone an eye catching quality, as was evident from the number of 'wow' exclamations in our Facebook live video. If you don't mind the size and weight, the Le Max has many distinguishing features in the design.

At 464 ppi, it doesn't have the most pixel dense display, but it does the job admirably. The colours are a tad warm, but it's what most users seem to like today. The only real problem is in the fact that it's dimmer than other flagships in the market right now.

Price ₹32,999

While the Snapdragon 810 performs well on this device, we have seen better and smoother devices. LeEco's eUI allows about 2GB of free RAM (out of 4GB), at most times, but overall, phones like the Nexus 6P and Moto X Force offer much smoother and fluid performance.

Lastly, the 3400 mAh battery last about the full day with regular usage, but the 21MP camera needs to improve. It can take good images in brightly lit condi-tons and OIS helps in shooting steady video, but it doesn't match up to the Nexus 6P when it comes to lower and fluorescent light conditions.

Le Max smartphone is defi-nitely worth considering if you have a budget of this range. The phone performs well, and while the camera is sub-par for the flagship range, it would work for many.

Prasid Banerjee

72

Features.....................................72
Design.......................................72
Performance............................69
Value 76

Specifications
Display: 6.33 inch QHD; **Processor:** Qualcomm Snapdragon 810; **RAM:** 4GB; **Battery:** 3400 mAh; **Operating System:** Android Lollipop; **Storage:** 64GB; **Camera:** 21MP rear, 4MP front

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MPOW Swift
Value for money wireless in-ears

After the recent Jaybird X2 and Brainwavz BLU-100 reviews, we now have two more Bluetooth IEMs entering the fray. The better looking one of them is the colourful Swift, made by Hong Kong based accessories manufacturer MPOW.

The housing on the Swift is unusually large, not light at all. In fact the earpiece is large enough to carry a comfort-ably spaced volume up/down button on it. Most users will find this feature quite useful since most people aren't very fastidious about carrying normalised tracks. It's one of those features you'll use only on a few occasions, but will thank the makers when you do. The ear pieces although large aren't heavy enough to be dislodged from your ear during normal activities like running, though they're not quite conducive to a vigorous

Interactive review

Price ₹2499

bout of headbanging. Is the heft advantageous in any way?

Presumably yes. The Swift performed exceedingly well on two fronts: battery life and Bluetooth range. It has a rated battery life of five hours but in our real world battery test, the device lasted for 5 hours and 38 minutes, which is quite commendable.

In terms of audio perfor-mance one thing was quickly apparent – the headphones are quite bass heavy. In the upper frequency ranges there is a definite loss of detail. Take for instance on a track such as Stereo Love, you'll get some thumpy bass but the sparkly clarity you get on the Brainvawz BLU-100 isn't present. In terms of pure audio performance it exceeds the ifrogs FreeRein Reflect but is behind the Brainwavz BLU-100. The sound signature on the MPOW Swift is definitely on the warmer side with more wholesome sound.

Ultimately the choice is simple: if you want bass and battery life go for the Swift. If you want more precise audio with the occasional stutter in connectivity or diminished battery life, you'll be better off with the Brainwavz BLU-100.

Siddharth Parwatay

77
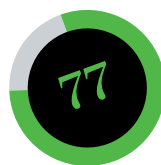
Performance............................72
Features....................................80
Value 82
Build 75

Specifications
Bluetooth: V4.0; **Bluetooth Profiles:** Headset/hands free/A2DP/AVRCP; **Range:** Up to 30 feet; **Rated battery life:** upto 5 hours; **Standby time:** upto 185 hours; **Charging time:** 2 hours

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Microsoft Surface Pro 4
Replacing your laptop, and bank balance

Microsoft has been wanting to replace your laptop with its tablet device for a few years now. But while they came close to doing so in the past, the Surface Pro 4 is the closest they've ever come to it. And some say that with this particular device, the Redmond giant may well have achieved the impossible. But alas, it's too expensive to recommend and the battery life is just not enough to fulfill Microsoft's dreams. Nevertheless, it's hard to deny the Surface Pro 4 is the best tablet in the market today.

The kickstand remains its most important design feature, and the Surface Pro 4 is lighter than ultrabooks like the Dell XPS 13. It weighs 786 grams, plus a few more for the Typecover case and can be placed at angles between 22 and 150 degrees. Needless to say, it suits almost all positions that you would ever need. If Microsoft can somehow figure out how to stop the device from wobbling in your lap, it would perhaps have perfected the design. It's still a much better designed tablet than the Apple iPad Pro, hands down.

Further, the fact that the Microsoft Surface Pro 4's 2736x1824 pixel resolution achieves a pixel density of 267 ppi on the 12.3 inch display. To say that the Surface Pro 4 has a 'nice' display would be a massive understatement. There are few ultrabooks that can rival this display, and amongst tablets, only the iPad Pro comes to mind.

The Surface Pen takes a bit of getting used to, but for animators and graphic artists, this does the job admirably. The fact that it attaches magnetically to the left side of the tablet makes it easy to carry around, and it sticks even when you're carrying the tablet around in your bag. You never realise what 1024 levels of pressure means until you have the Surface Pen in your hand. It's a joy to behold and a great input tool to work with.

None of this makes the Surface Pro 4 a true laptop replacement though. That job is undertaken by the Typecover keyboard, which Microsoft refuses to include in the box, thereby adding to the overall price. The Typecover keyboard has the perfect pitch to ensure that there is no learning curve. While the slight wobble can be an issue for some, the travel and feedback more than make up for it. Microsoft has even been able to make it backlit. As mentioned above though, it isn't included in the price, and it costs ₹12,490. This brings the starting price of the Surface Pro 4, a whipping ₹1,02,480!

Speaking of which, the lowest end Surface Pro 4 comes with 4GB of RAM and the Intel i5-6300U processor. Games like Asphalt 8 run like a breeze on the device and it shows better benchmark scores than laptops like the HP Spectre x360, and goes toe to toe with the most high-end laptops in the market today.

All that firepower takes a toll on the 5087 mAh battery though. The Surface Pro 4 can last through about 4 hours of constant video viewing (at 720p) and just a little longer when editing documents (with the screen brightness turned to maximum). You will have to carry the charger around with you usually.

To sum up, the Microsoft Surface Pro 4, for the most part, can indeed replace your laptop. However, the four hour battery life just doesn't cut it for a tablet that wants to be your only laptop. In addition, not including the Typecover case in the device's cost is perhaps the worst decision Microsoft has ever made, making its best device very difficult to recommend to the average buyer. Even for enterprises, the ₹1 lakh plus price tag seems too steep, especially in India.

So, while the Microsoft Surface Pro 4 is indeed the best tablet in the market today, beating the iPad Pro by miles, Microsoft still needs to work out the kinks if it really wants to sell this device, especially in a price sensitive market like India. Having said that, it'll be interesting to see if the Huawei Matebook comes at a more affordable price point in India, and whether it is powerful enough to justify spending money on it. Only time will tell. For now, all you have is the Microsoft Surface Pro 4.

Prasid Banerjee

Price ₹89,990

Interactive review

84
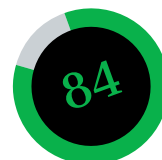
Features 80
Performance 96
Design 94
Value 64

Specifications
Processor: 2.5Ghz Intel i5-6300U processor; **RAM:** 4GB; **Operating System:** Windows 10; **Thickness:** 8.45mm; **Weight:** 786 grams; **Battery:** 5087 mAh

Contact
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HP Pavilion x360 13-s101tu
The all-rounder

*Interactive review*

Price ₹58,990

HP's convertible x360 range of laptops is its answer to Lenovo's Yoga series. These laptops are priced from about 30-ish thousand rupees to over 1 lakh. This HP Pavilion x360, a 13-inch model with a price tag of Rs. 58,990, sits in the middle of this range. On paper, it is a decent mid-tier machine, with a touchscreen and a rotating 360-degree hinge, hence the name. From the outside, the laptop looks premium and is reminiscent of the commendable design of the HP Envy 13. However, the build quality is not as premium as the Envy 13, which had an aluminum build. The x360, on the other hand, has a plastic build, but it is quite good.

The HP Pavilion x360 flaunts a 13.3-inch touchscreen with a 1080p resolution. The colour saturation is decent, as are the viewing angles, even though it features a reflective, glossy display. The touchscreen is quite good as well, and supports ten point multitouch input. It is also quite accurate and responsive. The model we reviewed, sported the new 6th Gen. Intel Core i5 processor (the i5-6200U) and combined with 4GB of RAM, churned out a good performance, considering the product category and price. Using the laptop as a daily driver, we were able to get about 5-6 hours of usage from it, which is quite impressive.

Overall, we believe that HP has been able to strike the right balance between performance and battery life, which makes this a functional hybrid laptop.

Hardik Singh

66
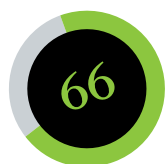
Features 56
Performance............................61
Value 83
Design 65

Specifications
Processor: Intel Core-i5 6200U; **GPU:** Intel HD 520 (integrated); **RAM:** 4GB; **Internal Storage:** 1TB; **Display:** 13.3-inch 1080p; **Keyboard:** Island type; **OS:** Windows 10; **I/O:** 2 x USB 3.0, 1 x USB 2.0, 1 x HDMI, SD card reader, 1 x RJ-45, 1 x Headphone/mic jack combo

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WD MyCloudEX2
Setting up a NAS, the quick and easy way

Easy-to-setup NAS devices are becoming more and more commonplace these and the WD MyCloudEX2 is one such device. We tested the 2-bay diskless variant and we must say that setting it up was effortless. The hard drive installation is tool-less and firing it up requires no core-technical know-how. What was surprising was the lack of buttons on the device. We're used to seeing one-button-backups for USB which the MyCloudEX2 has implemented via the software. The irksome part was the lack of a power button, this made the device too darn simple.

Performance-wise, we set up two WD RED drives in RAID 0 but the read and write speeds were behind every other 2-bay system we've tested last year. We're guessing the

Price ₹15,300

MyCloudEX2 Ultra should be in league with the rest in terms of performance thanks to the better SoC and double the RAM that the Ultra can boast of over the normal EX2. The device looks sleek and the drive cage is well built and cushioned against shocks with cooling provided by a small 35 mm fan. Moreover, there are a few apps available for the My Cloud to increase the device's functionality but the mere fact that the competition offers slightly better performance and more apps makes you want to look this one over.

The UI is very simple, a trend that we've noticed across the board which was once only afforded in the most premium of devices. All of these factors make the MyCloudEX2 worth the money you'd pay for it.

The WD MyCloudEX2 is easy to set up and use, offers above average performance and costs the same as most 2-day devices. This makes it a worthwhile contender if you are in the market for a new NAS.

Mithun Mohandas

59

Performance............................55
Features 60
Build Quality 61

Specifications
Model: WDBVKW0000NCH-BESN; **Capacity:** 0 TB; **Interface:** 2x USB 3.0, Ethernet; **Internal HDD:** Diskless; **Colour:** Black; **RPM :** Diskless; **Dimensions:** 171.45 x 145.94 x 99.06 mm; **Weight:** 0.8 kg; **Warranty:** 2 Years

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Samsung Galaxy S7 Edge
Along came the best

For Samsung, the year 2016 is more about refinement than innovation. Samsung took all the feedback it got about the original Edge devices and refined its design, while adding slight improvements that make for the best Android phone in the market today. That said, there is still room for improvement in this device, starting with the fact that Samsung still needs developers to create apps for its Edge display. It's quite disappointing that after a full year, there are still no good apps to use with it.

From a design standpoint, the Galaxy S7 Edge has everything that the S6 Edge Plus didn't. Despite its large display, the S7 Edge is barely bigger than the Galaxy A5, and that's saying something. The Xiaomi Mi Note Pro-like curves on the back make it more ergonomic and easier to hold, especially when picking it off a table. To complete the seamless design, Samsung has almost eliminate the camera hump, allowing the Galaxy S7 Edge to rest flat on a table.

We still have concerns about the glass back though. It's quite fingerprint intensive and at times, slippery. The last thing you'd want is to drop a phone with an Edge display.

Speaking of which, while the Edge display does add dollops of style to the device, its functionality is still quite limited. As mentioned above, there are few apps to choose from, but there are some other issues as well. For example, regular Android apps aren't made for such a display, because of which some buttons tend to be difficult to use. It creates a learning curve, but not a very steep one. Lastly, when you hold the phone in your left hand and try to reach for the Edge, your palm touches the left edge, thereby making the right edge non-responsive. It also happens sometimes when unlocking the phone using swipes.

Samsung should also work on bringing more to the Always On display. The feature is useful, but works only with some apps, meaning notifications from third party apps, like WhatsApp, don't show up. In addition, you can't interact with the display like in Motorola devices. Samsung has also disabled the Adoptable Storage feature in Marshmallow, which is a bummer.

From a performance point of view, the Galaxy S7 Edge is well ahead of last year's flagships. It can do 35% more frames on OpenGL 3.0-based games, than the S6 Edge could. It can go as high as 15fps on OpenGL 3.1-based games, while it starts showing frame drops on Android Extension Pack APIs. This is a tad surprising though, considering that Samsung boasts this phone for supporting newer Vulcan APIs. Of course, benchmarks are designed to tax the device to the fullest, so real world usability should differ. Sadly, there are no Vulcan-based games on Android, to test with right now.

Samsung has also increased the battery capacity on the S7 Edge, from 2600 mAh last year, to 3600 mAh this year. Interestingly, the battery life seems to have gone up proportionally. We were able to get about 16.5 hours, with 6 phone calls, 30 minutes of gaming, over 20 emails, lots of IMs, three messages on Hangouts and the screen turned to full brightness (but in auto mode) along with Always On Display. With Always On turned off, the battery life increases by less than an hour.

Lastly, the camera on the Galaxy S7 Edge may be lesser in terms of megapixels, but the quality hasn't been hampered. The 12MP camera boasts a f1.7 aperture and from the firmware version, it seems like a Samsung sensor.

The dual-pixel technology has indeed allowed the Galaxy S7 Edge focus much faster under low light, compared to its predecessors, and combined with the top-class image quality, it could easily be the best camera phone in the market today.

The Samsung Galaxy S7 Edge is indeed the best Android smartphone in the market, but there's still room for improvement. And that is a good thing. This gives us hope of more striking features in the Galaxy Note 6 when it comes out later.

Prasid Banerjee

Price ₹56,900

Interactive review

87
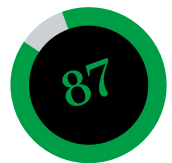
Features	90
Design	87
Performance	88
Value	77

Specifications
Processor: 2.3Ghz Exynos 8890 Octa; **RAM:** 4GB DDR4; **Camera:** 12MP rear with dual-pixels, 5MP front; **Storage:** 32/64GB, expandable to 200GB; **Operating System:** Android 6.0 Marshmallow; **Battery:** 3600 mAh; **Display:** 5.5 inch QHD

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Gigabyte GA-Z170X-UD5 TH

World's first Thunderbolt 3 motherboard

Interactive review

Price ₹22,300

When you look at the Gigabyte GA-Z170X-UD5 TH, there is a clear difference that puts it in a different league altogether and that's the presence of not one but two Thunderbolt 3 ports. Sharing the same physical port as a USB 3.1 Type C port, the Thunderbolt port supports

4K 60FPS video, 40 Gbps data transfer, 100 W power supply and support for connecting peripherals that use Thunderbolt/USB/DisplayPort/PCIExpress protocols. And there're two of these multi-tasking wonders on the GA-Z170X-UD5 TH.

The board looks a lot more premium thanks to a visibly cleaner soldermask. Also, this is a proper ATX motherboard which means it uses 9 screws for mounting and that gives it much needed rigidity. Featuring a new heatsink design that's only 25mm tall, Gigabyte has opted to go for greater width in lieu of greater height. Another aspect that we prefer is the placement of the Clean CMOS button away from the rear I/O. The audio solution remains the same Realtek ALC 1150 seated on an isolated section with isolated power supply. We really have no complaints except for the fact that there is a 4-pin fan header a little too close to the ATX CPU power socket but there is another header right beside the rear audio I/O so we can look the other way. You still have the handy G-connector and an M.2 port with 32 Gbps bandwidth. If you're looking to build a new high-end rigs, this is one of the boards you should consider.

80
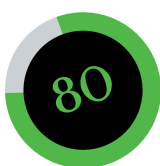
Features	91
Build	75
Value for Money	75

Specifications
Chipset: Intel Z170; **Memory support:** 4x3800(OC)MHz upto 64GB; **LAN:** Intel i219V Gigabit Ethernet; **Audio:** Realtek ALC1150; **SATA:** 6x SATA III; **Expansion:** 6x PCIe x16(x1/x16/x1/x8/x1/x4); **Dimensions (LxWxD):** 305 mm x 244 mm; **Warranty:** 3 years

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Mithun Mohandas

MSI GE62 6QD Apache Pro

This gaming beast can be tamed

Price ₹1,14,000

Sporting a contoured metal lid packed with attitude, and a SteelSeries keyboard that's great for both gaming and typing, and a large palm rest with generous trackpad, the MSI GE62 6QD scores well on build quality and usability.

Its 15-inch screen supports a Full HD resolution and is nice and bright – 296 cd/m2 at the max – with decent (but not great) contrast levels of 425:1. Thermal performance of the GE62 6QD is pretty decent measuring 47 and 52 degrees Celsius for its CPU and hard drive at load, which is not at all bad for a high-end gaming laptop. The Dynaudio speakers on the MSI GE62 6QD is very good – but not as great as the GT72QD of last year. The laptop's gaming performance is adequate given the GPU inside it – most modern games played just well on high settings in our subjective tests. Its battery life of just 93 minutes is abysmally low, though, even by gaming laptop standards.

This laptop does offer some high-end gaming features like Killer LAN and Nahimic audio boost, and the Cooler Boost 3 tech did keep temperature and acoustic noise down as advertised. If you can't afford to buy the more expensive gaming laptops, this is still a good machine to consider at the 1.2 lakh price range.

The GE62 6QD Apache Pro's 15-inch form factor is diminutive compared to the GT72QD's hulking 17-inch frame, but make no mistakes the GE62 6QD is as well built.

79
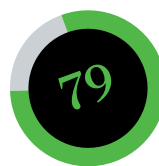
Features	73
Performance	77
Design	81
Value	85

Specifications
Screen: 15.6-inch, 1920x1080; **CPU:** 2.6 GHz Intel Core i7-6700HQ; **RAM:** 8GB DDR3; **GPU:** NVIDIA GeForce GTX 960M; **HDD:** 1TB 7200rpm; **Connectivity:** 2xUSB 3.0, 1xUSB 2.0, HDMI, miniDP, USB Type C, microphone, headphone jack, Gigabit ethernet, SD Card; **Wireless:** Wi-Fi 802.11ac, Bluetooth 4.0; **Weight:** 2.4 kg; **Accessories:** Laptop bag

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Jayesh Shinde

iFrogz FreeRein Reflect
Yet another budget wireless IEM

Interactive review

73
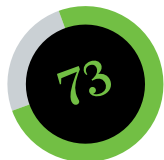
Performance................ 68
Features 80
Value 75
Build 70

Specifications
Driver size: 9mm;
Impedance: 40 ohm;
Sensitivity: 102dB +/- 3dB;
Frequency Response: 20Hz - 20KHz; **Rated battery life:** 5.5 Hours; **Battery capacity:** 75 mAh

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In recent times, the performance difference between a cheap audio product and a very expensive one isn't always instantly perceptible. The gap seems to be narrowing – nothing is really bad anymore and very few products are exceptionally good. At one time finding a $30 gem that outperforms $100 head-phones was a truly rare discovery. Today it's quite commonplace. The name notwith-standing, the ifrogz FreeRein Reflect is one such budget product that's not bad.

It's a Bluetooth in ear headphone meant for use during sports or activities that involve considerable movement. The fins on the ear pieces provide a secure fit while run-ning. The cable is tangle free and features a strip of reflective coating like on the JBL's Synchros Reflect. The idea is to make joggers more visible at night. The right earpiece has volume up/down controls and the power on/off/standby button. Despite

Price ₹2,999

the buttons the housing isn't large like the MPOW Swift. The controls are raised for tactile feedback and make for operation just by feel; they are also moisture resistant. The build isn't bad but attention to detail is missing, for instance the flap covering the USB charging input remains slightly open.

The signature is distinctly sharp i.e. the treble end is enhanced – making them sound tinny. Ordinarily if the reproduction is accurate this would only result in the sig-nature being bright. In the case of the ifrogz FreeRein Reflect, some amount of detail is lost but like I said earlier it's not bad. The battery life is rated for five and a half hours but in hour test it gave 3 hours 50 mins.

If you are getting them for a substantially discounted street price, they are worth considering. They are also good to use while running. But, you'd be slightly better off with the Brainwavz BLU-100.

Siddharth Parwatay

Titan Juxt
High on aesthetics, low functionality

The Juxt is Titan's first attempt at fusing an analogue wristwatch with 'smart' capabilities. The company has collaborated with HP for the technology, and the resultant juxtaposition has led to a product that is rather half-hearted.

To begin with, aesthetically, the Titan Juxt looks decent, and will appeal to most spending a large amount of money behind a wrist accessory. While the sporty detailing of digits on the dial and the concentric circles do not exactly blend with the stately outer Titanium ring and crown, it will work for most. The tiny monochrome OLED display is placed well, and the outer glass is super durable. Another advantage here is that, Titan being a traditional watchmaker, you have a practically

Price ₹15,995

unlimited array of straps to choose from. While the design department is a reasonable success, the smartwatch aspects are rather hindered. You get a step counter, apart from push notifications for calls (that you can also reject), messages and third party applications. The notifications take over a second to relay from the phone to the watch, and the tiny text on the screen coupled with the rigid buttons on the side do not help much. Battery life is nearly 60 hours, which is a major bonus here.

Overall, the Titan Juxt only suffices if you want your watch to be analogue, and yet relay notifications. For everything else, our smartwatch shootout this month should help.

Prasid Banerjee

69

Features 49
Performance............... 70
Value 65
Design 78

Specifications
Display type: OLED, **Smartwatch battery:** 60 hours, **Analogue battery:** 2 years, **Durability:** 5 ATM waterproof, **Sensor:** Pedometer.

Contact
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Website: titan.co.in

Brainwavz Omega
Possible king of the hill

After the success of the Brainwavz Delta, the Chinese manufacturer of headphones has launched yet another budget segment IEM in the Indian market – the Omega.

This review is mainly going to focus on finding out how the new Omega compares to its slightly more expensive sibling, the Delta and its direct competitor, the Cowon EM1.

The Omega is light and its all steel housing looks quite nice. It's available in White, Black and Red & Blue. We got the latter. Despite being cheap, the look and feel isn't. Don't get me wrong, the IEMs don't look premium by any yardstick but they don't look shoddy either. But what the Delta had over these headphones is that it came with a hard case. This omission is one of my biggest gripes against the Omega but hey at this price there's hardly a decent earphone that comes


Price ₹999

with a hard case. Features and bundled accessories include a three button in-line volume rocker and mic, two sizes of silicone tips, one pair of comply tips, a shirt pin which as we all know goes a long way in reducing chord noise, and a velcro cable strap. Phew!

The Omega has a pretty sharp sound signature and clarity that is pleasantly surprising at this price point. It is decidedly bass heavy and I couldn't be more emphatic about that bit. Between the Delta and Omega, I'd have to admit that the Delta does sound slightly more refined and the controlled bass is more attuned to my personal purist taste. This means that while tracks with higher instrument density might not sound very great, Stereo Love by Edward Maya & Vika Jigulina sound quite nice.

There is a sharpness to the Omega that makes even the EM1 sound pretty warm. The pure sound output of the Omega is slightly superior to the EM1 overall. The Omega is the new sub 1k star.

Siddharth Parwatay

70
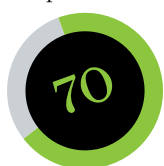
Features	70
Performance	70
Value	70
Build quality	67

Specifications
Drivers: Dynamic, 6 mm; **Rated Impedance:** 16 Ω; **Frequency Range:** 20 Hz ~ 20 kHz; **Sensitivity:** 98 dB at 1 mW; **Rated Input Power:** 3 mW; **Cable:** 1.2 m Y-Cord, Copper; **Plug:** 3.5 mm, Gold plated; **Warranty:** 2 Years

Contact
Distributor: Swordstreet Technology Systems
Availability: Amazon and FlipKart
Website: www.brainwavzaudio.com

DJI Osmo
An excellent handheld stabilised camera

The DJI Osmo has a quiet, understated elegance about its poise – an upright design with neat rubber inputs and the fusion of metal and plastic. Right from the onset, it preserves the balance of design and aesthetics, with ample palm grip, controls mounted at thumb position, well-oiled 360-degree swivelling gimbal and a rigid metal smartphone holder. The battery is inserted from the bottom, and overall, the Osmo is a well-built and neatly designed camera that also looks its part.

In terms of performance specific to video recording, the output quality from the DJI Osmo is smooth and surpasses expectations. It replicates colours very accurately

Price ₹54,250

to source, giving editors a wider scope to tune videos. Its noise cancellation is also excellent, as a result of which low light performance of the handheld video camera is quite impressive.

The main star of the DJI Osmo is the handheld stabilised gimbal that houses the camera's base, control buttons and orientation trigger. The rear of the gimbal, on which the palm rests, has a smooth curve and is rubberised to improve grip. It sits on the palm just perfectly, and bends outwards to the platform that neatly houses the controls for the Osmo's camera body. The stabiliser is almost incredible, and gives videos a feel of first-person shooter video games if you are walking with it. We have tried running with it and the results obtained were delightful. Focussing, however, was slow, and the Osmo took more time to adjust to the ambience.

The app connects via WiFi, and is easy to setup and use. If you're looking for a stabilised camera, the Osmo is as good as you can wish for.

Souvik Das

79
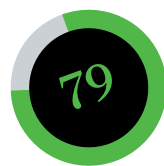
Feature	86
Performance	85
Value	65
Design	88

Specifications
Nett weight: 423g; **Sensor:** Sony Exmor R CMOS; **Effective resolution:** 12.4MP; **Lens:** 20mm (35mm-equivalent) f/2.8; **ISO:** 100-3200 (video) and 100-1600 (photo); **Audio:** 2-channel, 48kHz, AAC.

Contact
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Website: http://www.dji.com/product/osmo

Corsair Carbide SPEC Alpha

A radical shift in computer cabinet design

Gaming cabinets from Alienware stayed true to their name by offering futuristic design elements that certainly gave an impression of alien tech. On the same lines, the exteriors of the SPEC Alpha looks no less. Highly reminiscent of the turrets from the video game Portal, the cabinet feet play a big role in giving it that distinct look. They also ensure there's a considerable distance from the floor for air intake from the bottom (if you install a case fan). If these feet don't impress you then you can buy aftermarket rubber feet and attach them in the provided holes at the bottom. Before going into the regular internal components of the case, there's one glaring change that needs to be addressed – the optical disc drive slot has been completely removed. This might not bother you much if your DVD drive has been collecting dust ever since you built your system. If you don't have the luxury of a high-speed internet connection, you would still be dependent on physical DVDs for software and games. But this shouldn't be really a concern since USB-powered external DVD drives are available that aren't really expensive. This decision for a paradigm shift wasn't the company's alone and in fact, the request was honoured after feedback from customers.

Apart from this, the interiors remain the same compared to the previous Spec cabinets. The front and top panels have an angled design, both meshed. The front panel comes with two 120mm fans with sliding slits, in case you plan on adding a third fan at the bottom. The top panel can house two 120mm fans as well, but there's not enough room to fit in a radiator. These fans can be controlled with the three-speed fan controller on the front panel. To be able to reach and install the third fan, you'll have to remove the drive cage that houses three HDD slots and two SSD brackets, and additional two SSD brackets can be found behind the motherboard plate. If you plan on replacing the stock fans with aftermarket coolers and radiators, or even if you want to install a second GPU (310mm in length), you will have to remove the drive cage. Installing HDDs and SSDs won't require any tools. The cabinet offers a generous numbers of tie-slits and paths for cable management, except for the CPU power cable that wouldn't fit through the top right corner cutout.

The side-window panel has a transparent plexi-glass which is susceptible to scratches so you'll

Price ₹6,499

need to be extra careful while handling it. The thumbscrews don't fall off their grooves, clinging to them which is good and should be adopted by all cabinet manufacturers. On the other hand, we weren't able to screw in the side-window thumbscrews on the review unit we received, and we hope that this problem persists only on our unit. This also made the panel leave a wide gap at the front, making it look defective. One more concern that bothered was about not having any grooves to pick up the cabinet. The meshes on the top and front panel don't have any dust filters and you'll find one only at the bottom.

The absence of the optical disc drive certainly improves the airflow, even with the stock fans. With the fans spinning at full speed, the 4960X lay stable at 62 degrees having Prime95 run for five minutes. FurMark is quite intensive and the Radeon HD 7790 heated up to 60 degrees in the preset settings (burn in switched off). Measuring the temperature zones revealed that the CPU area stayed cool at around 40 degrees which wasn't a surprise because of the front intake fans and the rear exhaust fan working together. In full potential, which is three fans at the front, two on the top, one at the bottom and one at the rear, airflow will immensely improve and make the enclosure far cooler.

Abhijit Dey

Interactive review

74

Performance	74
Features	78
Build	75
Value	68

Specifications
Motherboard form factor: ATX and Micro-ATX; **PSU form factor:** ATX standard; **Front I/O:** 2 x USB 3.0, Mic in and Audio Out, 3-speed fan control; **Drive options:** 3 x 3.5-inch HDD, 4 x 2.5-inch SSD; **Fans:** 3 x 120mm

Contact
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Redmi Note 3
Xiaomi's back with a bang, and how!

Price
₹11,999

Interactive review

87
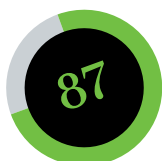
Performance	86
Features	85
Build	82
Value	95

Specifications
SoC: Qualcomm Snapdragon 650 with hexa-core processor (2x1.8 GHz A72 + 4x1.4 GHz A53); **GPU:** Adreno 510 GPU; **RAM:** 3GB LPDDR3; **Storage:** 32GB (with expansion slot); **Display**: 5.5-inch 1080p IPS display; **Weight:** 164g **Battery:** 4050mAh; Camera: Rear - 16MP, f/2.0 with phase detect AF and dual tone led flash, Front - 5MP, f/2.0; **OS:** Android Lollipop 5.1.1 running on MiUI 7

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After a relatively quiet period, Xiaomi has come back into the affordable smartphone segment with an impressive device that not only outperforms all smartphones in its segment, but also edges past some Android flagships. The all-new Xiaomi Redmi Note 3 with the Qualcomm Snapdragon 650 SoC is almost a game-changer in terms of what one can expect from a smartphone priced at ₹12k. It's a game-changer in terms of pure performance and battery-life, two key aspects of a smartphone that almost makes or breaks it for users in this price segment.

The newly-launched Xiaomi Redmi Note 3 is all about performance, and most of it comes from the Snapdragon 650 SoC. The benchmark charts and comparisons below evidently shows how the Snapdragon 650 SoC is vastly superior in terms of pure performance. Such high performance usually comes at the cost of some sort of a trade-off in battery life or thermal management capability. But, in case of the Xiaomi Redmi Note 3, you can have it all. Benchmark numbers aside, we decided to tax the smartphone with some of our own back-to-back tests that are known to bring most smartphones

down on their knees. We started with recording a 5-min UHD (2160p) video clip, something that isn't supported by the default camera app on the Xiaomi Redmi Note 3, but we bypassed the limitation via the Google camera app that records videos in UHD on this smartphone. The UHD video capture test was immediately followed by a 30-minute gaming session (Asphalt 8 + Modern Combat 5), and we ended the test with a quick re-run of the AnTuTu benchmark. Across all the three tests, the Xiaomi Redmi Note 3 showed no signs of stuttering or excessive heating. Apart from the benchmark numbers, the Xiaomi Redmi Note 3 offers truly excellent performance in real-world scenarios, and it does that without any compromises like heating issues or rapid battery drain. Talking about heating issues, unlike the Xiaomi Mi 4i, the Redmi Note 3 doesn't get excessively warm or uncomfortable when put under stress. The 5.5-inch 1080p IPS display on the Redmi Note 3 is actually quite good in terms of brightness levels, colour quality and viewing angles.

Xiaomi's "secret sauce" behind the Redmi Note 3 has a lot to do with the battery inside the device. The 4050mAh battery inside the device is big in capacity, but small in volume. Xiaomi has achieved this by packing a 690Wh/L high density battery inside the Redmi Note 3. In terms of real world usage, on a full charge, we were easily able to get through a full day of heavy usage with 15% of battery life left at the end of the day. With average use, you can easily expect two days of battery life.

Unfortunately, the Redmi Note 3 somewhat drops the ball when it comes to continuing the trend of bettering its cameras. Sure, the 16MP camera with phase detection AF is fast in terms of focusing and capturing speed, but the core image quality degrades rapidly in low-light.

In terms of build quality, the device feels solid, and the use of metal lends a sense of ruggedness and quality to the device. The smartphone does look more premium in comparison to previous Redmi Note devices, but the extra smooth finish at the back does make it a bit too slippery and prone to accidental falls.

The Xiaomi Redmi Note 3 is a highly recommended smartphone in its price segment, especially if you are looking for a smartphone that offers unparalleled performance and battery-life.

Soham Raninga

worldview

OUR PICK OF THE BEST TECH ARTICLES FROM AROUND THE GLOBE

(MUST READS)

EVER WONDERED HOW SNAPCHAT MAKES MONEY?

Snapchat has been growing since it was released on app stores and has gone to be in top 10 most downloaded apps in 100 countries. Here's how Snapchat has grown and successfully built a business out of a self-disappearing messaging app.
http://dgit.in/SnapBiz

OPTIMISE YOUR BLOG FLAWLESSLY

Even though the basics of SEO haven't changed much, every update in a search engine's algorithms may potentially force you to rethink your SEO strategy. To up your blog's ranking, you need to know how to optimise it perfectly. Here is a guide to it.
http://dgit.in/FlwsSEO

FORGET YOUR PASSWORDS

Not very long ago we featured the most stupid passwords of 2015 here but it seems like we might not be able to do it next year. Why you ask? Passwords soon will be dead as multi-factor authentication takes over. No remembering 123456. Yay!
http://dgit.in/PwdDead

IEM'S TO GET SMARTER

Experts in UX, AI, and product designers have been trying hard to find the next big thing that technology will give us after smartphones. Newer reports suggest it might not be the smartwatches, but IEM's.
http://bit.ly/SmartIEM

[Wired Corner]

JUST HOW EXACTLY DOES SUPERMAN'S X-RAY VISION WORK?

A lot of comic book nerds are in agreement that if you had to compare apples to apples, where an apple is actually a superhero, Superman would kick every other superhero and villain's derriere. Thanks in no small part to his superhuman vision!
http://dgit.in/SupXrayWrd

Kickstarting crowdfundings

"Got a great concept? Need funding? Share it on crowdfunding platforms!" Studio Neat did exactly the same to go on to become the 'Kickstarter Kings' and taught us the art of crowdfunding. Here's how. Warning: It's a super interesting story.
http://dgit.in/KickStrKng

AI, reply to my Emails!

Capabilities of artificial intelligence are staggering and Google has taken a step ahead to incorporating AI into sending e-mails as well, adding Smart Reply on browsers now. In case, you were wondering how does it all work, here are the answers to your questions.
http://dgit.in/InboxAI

The smaller the merrier?

Following the bandwagon, Apple too joined in the pool of releasing a 'mini' version of flagship devices with the launch of iPhone SE. Our only concern being after years of upsizing, why are smartphones suddenly trying to shrink the screen size?
http://dgit.in/iSmallphone

VIDEO GAME REHAB

Playing for almost 20 hours a day, Callum ranked seventh of seven million people who play World of Warcraft, ending up at reStart. reStart is US' first residential center for digital addiction that helps you get rid of video game addictions. Here's his complete story: http://dgit.in/VGRehab

LIFE IN A MARTIAN COLONY

"When we emerge on 28 August 2016, we'll be veterans of the longest NASA-funded Mars simulation in history." We wonder why a space architect, an engineer, three scientists and a crew doctor are living the "Life on Mars", well, actually on sMars. http://dgit.in/MarsSim

WHERE DO ALL THE DEFECTED IPHONES GO?

At an undisclosed place in Hong Kong, under tight security, is a place where Apple has been grinding and recycling all its iPhones. But not all of the defect ones make it to the dumping yard. So what happens to these defected iPhones? http://dgit.in/iEWaste

LIFE OF AN APP

Thousands of apps are listed on various app stores daily but just a fraction of them end up successfully get the audience attention and the fame. Here is a timeline of an app, the phases it passes through–starting from the idea of its creation to its death. http://dgit.in/LifeOfApp

Technology Addiction: Myth or Reality?

Overuse of technology is considered the new normal these days but facts prove otherwise. A lethal addiction has been on the rise since the invention of the internet. Now, it's at at the brink of an explosion.

– By Adamya Sharma

Remember the familiar sight of a person walking with a bulky old stereo system literally stuck to to their ears? Or when as children we were scolded for being stuck to the idiot box, paralysed in awe of our favourite cartoons and magical robot children (Small Wonder fans would know)? Those of you looking for a more current example, remember that time your dinner date was buried in his/her smartphone, leaving you no option but to Instagram food pictures for entertainment?

The keywords to take home here are - 'stuck', 'buried' and of course – 'entertainment.' For time immemorial, human beings have succumbed themselves to countless health problems thanks to their constant need for entertainment. Early man would draw on rocks for visual entertainment and expression, kings and queens would court jesters and performers to keep themselves in high spirits.

With time, came the age of the devices. Radios and television sets had parents and teachers worried worldover. Finally, came the internet and the rest, as they say, is history.

Technology has us hooked, cooked and booked. So much so that this need for entertainment, or rather the need to escape into the virtual world, has now become our nemesis. But, is technology to blame solely and entirely?

Dr Neha Patel is a Clinical Psychologist from Mumbai who has years of experience in handling patients suffering from Internet/device addiction problems. For her, technology is not the evil in this situation, but it surely cannot be ruled out as an accelerator of the problem. "What happens generally is that there are other factors that lead to the addiction. It is because people are trying to escape from something else sometimes, or if they are really bogged down by some other issues. It could be education related, relationship related or anything else," says Patel.

She continues to explain, "Because of so many devices available and also because

someone else has it and you want to have it, so many apps available, the human connect has gone down. We don't even wish people on a one-on-one basis. It's either a message or a Facebook post. Multiple devices have obviously added on to such problems. But, what I always say is that let's not blame the device, it's about how you are using them. It's amazing how many devices are available right now. Earlier, if a person had depression, the issues that would come up because

of it were different. Now, the addiction is different. Technology is easily available and gets caught in the crossfire."

Internet addiction disorder or IAD is a term that's been around for a while now. IAD refers to excessive internet usage, but broadly and in light of the exponential growth of devices, a new term is emerging in the industry. That term is - Digital Dementia. The term was first coined by German neuroscientist Manfred Spitzer in his book with the same name. The book describes how overuse of technology can severely hamper cognitive abilities. Just to put things in perspective, such a breakdown of cognitive abilities also occurs when a person suffers from head injuries or psychiatric illnesses.

Dr Patel asks, "Do you remember phone numbers like you used to before?" Put across to anybody, this question would gather a resounding no. Unless one is blessed with a photographic memory, in today's day and age, no one really dials from memory. This is just one example of the loss in human cognitive abilities over extended periods of using technology. Patel continues to explain how this phenomenon occurs in our brains, "Our brain makes pathways, neural pathways. It's like how a dirt pathway just comes about. Now, those are not happening anymore. Our memory is getting affected majorly."

The truth about how one's own cognitive abilities take a hit is an extremely uncom-

A COMPUTER MADE OF BRAINS

Oshiorenoya Agabi's startup Koniku believes that brain-like processors lack one component: actual brains. Koniku is building chips with biological neurons. Rather than mimicking the brain function with chips, Agabi is using the actual material of human brains!

http://dgit.in/BrainComp

STAR TREK'S TIME TRAVEL THEORY

Time travel being one of the most interesting devices in Star Trek, however, is also confusing and inconsistent. Do the past alterations get mixed into the current time-line? We tell you all about the theory of time travel in Star Trek.

http://dgit.in/STTimeTr

25 HARDEST GAMES OF ALL TIME

Hardcore gamers often complain regarding the difficulty levels being low as newer games are entering the marker. From the darkest corners of gaming history, here are 25 hardest video games that made it to the market. How many have you completed already?

http://dgit.in/HrdstVidG

PLAYLIST FOR PRODUCTIVITY

Music has the power to influence our working patterns and help us concentrate as well as think efficiently. Different tasks require different levels of concentration and here are the playlists you would want to listen to while working, to ensure maximum output.

http://dgit.in/ProductivePL

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fortable realisation. Experts like Dr. Patel believe that the root cause of Internet disorders or overuse of devices is buried deep in a person's psychology, one that is beyond devices, the internet or technology. Mental health history, living environment, personality traits and even the knowledge of the addiction are enough to further the overuse of technology.

A study concluded by the University of Maryland found out that 'addiction to technology' is similar to 'addiction to drugs'. The research paper was titled 'The World unplugged', in which a very clear majority of over 1000 students from 10 countries were unable to quit their devices voluntarily, even for a single day. Students also admitted to feelings of anxiety and depression when forced to give up their media and technology.

Another study conducted by the Indian Council for Medical Research also found that from the 2,750 participants they studied, there was an "alarming" rate of dependence on technology.

Many other studies like these, coupled with the constant growth of smartphones, tablets and other devices, is what has now given rise to dedicated de-addiction centers. David McNamee of Medical News Today describes them as "Gold Star internet de-addiction centers and treatment programs."

ReStart Life is one such luxury digital de-addiction center based in Redmond, Washington. ReStart Life deals with people who may be addicted to the internet, video games, social media and virtual reality. VR being the most recent addition to their list of digital addictions, even though the population of VR users is still extremely limited. While ReStart Life may be a high-flying retreat for those digital addicts who can afford it, most such de-addiction pro-

grammes limit themselves to internet and gaming addiction treatments. In fact, as per Dr Patel, internet porn and gaming are the two most common addictions that exist in our digital lives today.

With all these internet/device addiction programmes cropping up, a common question that arises is - **How is digital addiction diagnosed?**

Well, because of the lack of research and understanding on the subject, there is no standard way to recognise digital dependency patterns in people, but, Dr. Kimberly Young, a professor at St. Bonaventure University and director of the Center for Internet Addiction Recovery developed an Internet Addiction Test (IAT) to assess symptoms of Internet addiction and compulsive behaviour in adults.

IAT was developed back in 1998 and since then has received a number of updates to keep it current. The purpose of IAT is to measures the severity of online addiction, self reported by users. The test was developed by adapting to the existing criteria for pathological gambling in the Diagnostic and Statistical Manual of Mental Disorders.

You can take the Internet Addiction Test at http://dgit.in/IntAddTst.

While an addiction to technology may be difficult to admit, especially when treatment for this niche disorder can cost a bomb and upwards, there are many real life examples of people losing their minds and bodies

to the overuse of tech. Last year, a 32 year old Taiwanese man was found dead in a gaming cafe after 3 days of binge gaming. The man had suffered a cardiac arrest while playing, although the real reason for him to be at the gaming parlour for 3 days was the fact that he was unemployed for a while and could have been suffering from depression.

Way before in 2005, a Korean man had also lost his life after 50 hours of continuously playing battle simulation game Starcraft.

Selfies, the newest digital addiction, took all of 27 lives in 2015. Most of them were people from India. The Mumbai police has even recognised 15 "no selfie zones" in the city after several such accidents occurred there.

If these examples aren't enough to convince you of the severity of the problem, you will soon be able to see a real-life story of 2 normal teenagers who turned murderers, because of a warped idea from the internet. Directed by Irene Taylor Brodsky, the HBO documentary titled 'Beware the Slenderman' traces the lives of two teenagers, Anissa Weier and Morgan Geyser, who stabbed and murdered their friend, in hopes of finding the mystical castle of Slenderman, a character from the internet who apparently "told them to do it." Can you feel the goosebumps yet?

Now, these are a just handful of the many disturbing examples of how the internet, devices and technology shape our minds and our lives in the digital age. Such instances also beg a very important question - Are we a growing generation of technology addicts? The signs are all there, it's just a matter of time before we wake up, step outside our virtual worlds and smell the coffee!

http://dgit.in/TechAddct

HYDRAULIC PRESS CHANNEL

If you love oddly satisfying videos or just love to see things getting crushed by a hydraulic press? Check out to

see how things are left after being crushed with a hydraulic press, including a Nokia 3310.

http://dgit.in/yTChPC

BLIPP TO GET ALL URLS in this issue

To get all these links in one easy to read page, make sure you blip this page from your smartphone.

(PRODUCT LAUNCHES)

RAZER BLADE 2016

Featuring a 14-inch IGZO display, the Razer Blade 2016 is powered by an i7-6700HQ processor along with 16GB DDR4 RAM and has 6GB of VRAM with Nvidia GeForce GTX 970M graphics processor. Price: $1,999 (₹1,34,900 approx) (256GB)

VERNEE APOLLO

China-based Vernee unveils its flagship for 2016, the Apollo. Packing in a MediaTek Helio X20 SoC along with 6GB RAM and 128GB storage, it flaunts a 5.5-inch QHD display supporting Force Touch, packed in an all metal design. Price: TBA

WD PIDRIVE

WDLabs' new storage drive is designed and optimised specially for Raspberry Pi Devices. It comes with 314GB of storage capacity and incorporates low power USB operation and custom magnetic recording. Price: $31.42 (₹2,100 approx)

PICTURE PUZZLE

ABSOLUTE TIMEPASS

UNJUMBLE ON YOUR MOBILE

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http://dgit.in/RoboHndEye

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Duration: 06.52
Does building a driverless car need you to be as big as Tesla or Google? Wrong.
http://dgit.in/BldDrlCar

YouTube ID
Duration: 05.09
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http://dgit.in/YtUrLid

CryEngine V on pay as you like model.
http://dgit.in/
CryEngineVPay

Introduction to Realm: Why you don't SQLite anymore?

>>A deeper look at the SQLite replacement that is being used widely by the industry> by **Vivek Ramesh**

What is Realm?

Realm is a third party database tool that claims to be a replacement for SQLite and CoreData and attempts to simplify a issues encountered while writing SQLite such as boilerplate code, threading support and asynchronous queries. Currently, you can use Realm in your Android app built using Java, IOS app built using Swift or Objective-C or a cross platform app built using React Native.

How to setup Realm in Android?

1. Realm does not work with Java outside of Android at the time of writing this post.
2. Use Realm with the latest version of Android Studio whose version >= 0.8.6 and Java JDK whose version is >= 7
3. To understand the usage of Realm, we consider a bucket list app called BucketDrops. Check the links section for more info on this app.
4. Create a new project in Android Studio, call it BucketDrops and open its build.gradle file corresponding to the module app.

5. FInally, add compile 'io.realm:realm-android:0.87.5' to the dependencies of your project and sync your gradle files.

Realm with Java
Models

A model represents the data that you want to store, which in our case is the goal that a person wishes to achieve (what), the time it was added (added), the target time or the time by which you would like to accomplish the goal (when) and whether the goal was marked complete by the user or not. Let's examine the model with SQLite and Realm.

SQLite

What	Added (Primary key)	When	Completed

Create the above table in SQLite with Added as the primary key.

Realm

You don't need to create a table for the same while using Realm.
1. Create a class in Java.
2. Extend from RealmObject which essentially qualifies your class as being the model.

*Coding Matters

*Left Pad Chaos
>>A dev unpublished some modules on NPM and made thousands of project builds, including Babel, fail for a while
http://dgit.in/LeftPadChaos

*SQL Server on Linux
>>Microsoft has officially announced plans to bring SQL Server which was till now limited to Windows onto Linux sometime in 2017.
http://dgit.in/SQLServLinux

*Microsoft's AI Chatbot
>>Microsoft launches and subsequently takes down Tay, an AI chatbot after it mimics racist, sexist, pro-Hitler tweets
http://dgit.in/MSTayChatbot

TWEETS 96.1K FOLLOWERS 60.3K

3. Add the columns or fields which you would prefer as instance variables inside the class.
4. Ensure those instance variables are private.
5. Create getter and setter methods.
6. Don't add any custom logic inside these methods.
7. Use the @PrimaryKey annotation to mark a field as the primary key
8. Use the @Ignore annotation to mark a field so that it is not considered as a column in your table.

Refer to SNIPPET 1 from HERE http://dgit.in/RealmCode

That's all you need to make a model in Realm. Each class you create which extends from RealmObject can be considered to be a separate table while visualizing the data.

Data Types
Realm supports the following field types: boolean, byte, short, int, long, float, double, String, Date and byte[]. The integer types byte, short, int, and long are all mapped to the same type (long actually) within Realm. To represent relationships, Realm uses something called a RealmList which is conceptually similar to an ArrayList in Java. The RealmList can work with boxed data types such as Boolean, Byte, Short, Integer, Long, Float, Double and RealmObject itself allowing you to create a RealmList<? extends RealmObject>.

Annotations
Realm uses several annotations such as @PrimaryKey @Index @Required @Ignore to let you define certain requirements in your data model.

@Required: Lets you mark a field so that it cannot have null values.

@Ignore: Lets you mark a field so that its value is not saved to the database. For example, you may want to use the same model class for representing JSON data with some additional fields and store only some of them in the database.

@Index: Adds a search index to the field which makes inserts slower and the data file larger but queries will be faster. It is recommended to add index when optimizing specific situations for read performance. Realm supports indexing: String, byte, short, int, long, boolean and Date fields.

@PrimaryKey: Specifying this over a field lets you mark that field to be used as a primary key by Realm. You can apply this to a field whose data type is either an integer (byte, short, int, long) or String. It is currently not possible to use a compound primary key. Primary keys cannot have a null value, and the @PrimaryKey annotation uses the @Required annotation implicitly.

Limitations
The following restrictions apply when you are creating a model class in Realm.
- Instance fields should be kept private.
- Don't write custom logic inside getter and setter methods as they won't be executed.
- Both public and private static fields are allowed along with static methods.
- You can implement interfaces without any methods in them.
- It is not possible to override methods such as toString() or equals().

- Limitations with respect to other aspects of Realm are explained in detail HERE (https://realm.io/docs/java/latest/#general)

Relationships
Let's examine our Bucket Drops app where multiple users can use the app on the same device and add drops to their bucket list. We need to track which person added the drop and use relationships for that purpose. We create a class called Person with a relationship to the Drop class which we created earlier.

Refer to SNIPPET 2 from HERE http://dgit.in/RealmCode

One Person object can be related to many Drop objects with the help of the RealmList class. Similarly, one-to-one and many-to-many relationships can be modelled easily. It can be visualized as shown below.

Person	
Email	Drops
abc@gmail.com	
xyz@gmail.com	-----

Drop			
What	Added	When	Completed
Party	...	...	...
Movie	...	...	...
Outing	...	...	...

Now that you have seen how relationships look like in Realm, lets get to the fun part where we perform some operations on this database in the next section.

Configuration: How to set it up?
CRUD: Create, Read, Update, Delete
Create
You can add your own constructors in Realm as long as you have one default constructor.
- Get an instance of the Realm class
- Begin a transaction
- Create the object
- Set the required properties whose values will be persisted
- Commit the transaction

Refer to SNIPPET 3 from HERE http://dgit.in/RealmCode

Instead of using the copyToRealm method which adds a new entry time, you can also use the copyToRealmOrUpdate method which inserts if the item does not exist and updates the item otherwise. It however requires your model to have a primary key. Another way of performing the insert would be as follows.

Refer to SNIPPET 4 from HERE http://dgit.in/RealmCode

Read
Read operations don't block each other and don't require transactions. They use a FLUENT interface with the help of which you can define conditions on which objects you would like to read.

Read All

Refer to SNIPPET 5 from HERE http://dgit.in/RealmSnippets

The RealmResults object contains those Drop objects that satisfy some condition. In our case we have not specified any condition and thereby retrieve all the objects of type Drop stored in Realm. We can iterate over RealmResults like a simple ArrayList and process the data further.

Read all drops made by the person 'abc@gmail.com'

Use the equalTo method to specify the values which you would like to match for a particular field.

Refer to SNIPPET 6 from HERE http://dgit.in/RealmCode

Update

Update looks similar to any other write operation. Here are the following steps to perform an update
- Get an instance of the Realm class
- Begin the transaction
- Modify the object.
- Commit the transaction.

Update the email of the Person from 'abc@gmail.com' to 'def@gmail.com'

In the snippet below, we simply locate the first Person object whose email is 'abc@gmail.com' and update its value with the help of a setter method inside a transaction. If there are more than one people with the email 'abc@gmail.com' we would simply use the findAll method instead of findFirst which returns a RealmResults. We can loop through the RealmResults and call the setter method on each object.

Refer to SNIPPET 7 from HERE http://dgit.in/RealmCode

Delete

If you wish modify or delete any of the objects in a RealmResults, you must do so in a write transaction. Here are the steps to delete an item permanently from Realm.
- Get an instance of the Realm class
- Begin the transaction
- Delete one or more objects.
- Commit the transaction

Refer to SNIPPET 8 from HERE http://dgit.in/RealmCode

Transactions: How to persist changes?

In Realm, all write operations (adding, modifying, and removing objects) must be wrapped

in write transactions. A write transaction can either be committed or cancelled. During the commit, all changes will be written to disk, and the commit will only succeed if all changes can be persisted. By cancelling a write transaction, all changes will be discarded. Using write transactions, your data will always be in a consistent state.

Synchronous

So far we wrote synchronous transactions which can also be written in a different way. Instead of manually keeping track of realm.beginTransaction(), realm.commitTransaction(), and realm.cancelTransaction() you can use the realm.executeTransaction() method, which will automatically handle begin/commit, and cancel if an error happens. Let's take our earlier example of adding a drop to Realm and use a transaction block for the same.

Refer to SNIPPET 9 from HERE http://dgit.in/RealmCode

Asynchronous

By using an asynchronous transaction, Realm will run that transaction on a background thread and report back when the transaction is done. Use the overloaded executeTransaction method that takes one more parameter known as Callback which has two methods: onSuccess and onError where we can execute code depending on the outcome of the transaction.

Refer to SNIPPET 10 from HERE http://dgit.in/RealmCode

Queries: How to do operations on data?

Realm's query engine uses a Fluent interface to construct multi-clause queries. Queries in Realm are lazy in the sense that actual data is not copied unless it is needed.

Operators

We executed some pretty basic queries earlier like trying to find the person whose email is 'abc@gmail.com' Lets explore the operators in more depth.

Refer to SNIPPET 11 from HERE http://dgit.in/RealmCode

Some operators that you can use in place of contains would be between(), greaterThan(), lessThan(), greaterThanOrEqualTo(), lessThanOrEqualTo(), equalTo(), notEqualTo(), contains(), beginsWith() & endsWith() along with logical operators such as and(), or() and not()

Instead of using equals which compares all the text in the email to match with 'gmail', we use the contains clause which means gmail can be present anywhere in the email field.

Sorting

We can easily sort the list of emails which we retrieved in the previous step by calling the sort method on the RealmResults object. Use the sort method which accepts the name of the field on the basis of which items are sorted in the ascending order by default.

Refer to SNIPPET 12 from HERE http://dgit.in/RealmCode

Aggregating values

Realm also lets you aggregate results and obtain the minimum, maximum, average or sum of all values for a field. In our case, if the Person model class had a field called age, we could perform the following operations.

Refer to SNIPPET 13 from HERE http://dgit.in/RealmCode

Iterating

There are several ways of iterating through the RealmResults obtained after performing a query. Don't forget to use a transaction if you plan on updating any or all of the Person objects.

Refer to SNIPPET 14 from HERE http://dgit.in/RealmCode

Synchronous & Asynchronous Queries

The queries we executed so far run on the UI thread. Given that Realm loads data lazily and Realm uses a highly efficient structure to store and retrieve data, synchronous queries perform pretty fast compared to SQLite. To run a query asynchronously, we first create the query and use the findAllAsync method instead of the regular findAll method.

Refer to SNIPPET 15 from HERE http://dgit.in/RealmCode

The query is not blocking and immediately returns a RealmResults<Drop>. This is a promise similar to the concept of Future in standard Java. The query will continue to run in a background thread, and once it completes it will update the returned instance of RealmResults. If you want to be notified when the query completes and the RealmResults object is updated, you can register a RealmChangeListener. This listener will be called every time the RealmResults are updated to reflect the latest changes in the Realm. You can only use asynchronous queries on a Looper thread.

Refer to SNIPPET 16 from HERE http://dgit.in/RealmCode

In the final step, simply register and unregister for the listener inside your Activity or Fragment to prevent memory leaks.

Refer to SNIPPET 17 from HERE http://dgit.in/RealmCode

Advanced Concepts

Several advanced concepts in Realm dealing with its configuration, encryption, notifications, json processing and multithreading are covered in detail here. (https://realm.io/docs/java/latest/#realms)

Conclusion

Realm is a free product as of March 16, 2016 and has been in use since 2012 in commercial apps for both Android and IOS. It has a growing community with 24x7 support available on its GitHub repo for the most common difficulties you will encounter. It accelerates development time compared to SQLite while being truly cross-platform in nature.

Links

Java documentation for Realm https://realm.io/docs/java/latest/
If you want to learn more on how to use realm in a practical android application, check the complete bucket drops series which covers it https://goo.gl/WvX8GD >

The author has published a certificate course "Launch Your First Android App in Just 16 Hours!" on the Pyoopil App. Pyoopil is a personal learning network, which allows you to take amazing courses and keeps you connected to your mentors and peers. Use the code 'DIGIT' to get a 70% discount on this certificate course. Here is the link: http://dgit.in/PyoopilApp

*Nodes of Interest

*Tax Benefit for Devs
>>A pending bill in the senate of New York aims to provide tax credit to open source developers

http://dgit.in/OpnSrcTaxCredit

*MAME Open Source
>>After announcing it last year, Multiple Arcade Machine Emulator is now open source.

http://dgit.in/MAMEFree

*Netflix's coding
>> Netflix tech blog on how code is built at Netflix, the global content streaming giant.

http://dgit.in/NetflixCoding

digit RECOMMENDED BUYS

From smartphones to graphics cards, here's what we recommend for your next purchase!

TOP 3
4K MONITORS

Brand	Model	Price (in ₹)
LG	31MU97	90,000
BenQ	BL3201PT	115,000
Dell	UP3216Q	131,230

TOP 3
PREMIUM SMARTPHONES

Brand	Model	Price (in ₹)
Samsung	Galaxy S7 Edge (32GB)	56,900
Apple	iPhone 6S Plus(128GB)	82,480
Samsung	Galaxy Note 5(64GB)	53,900

TOP 3
WINDOWS SMARTPHONES

Brand	Model	Price (in ₹)
Microsoft	950 Xl	48,490
Microsoft	950	42,360
Microsoft	640 Xl	17,900

TOP 3
SMARTPHONES UNDER 10K

Brand	Model	Price (in ₹)
Coolpad	Note 3	8,999
Xolo	Black 1X	8,499
Coolpad	Note 3 Lite	7,000

TOP 3
SUPERZOOM CAMERAS

Brand	Model	Price (in ₹)
Sony	DSC-RX10M2	94,990
Panasonic	DMC FZ1000GA	57,272
Canon	PowerShot G3 X	59,995

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GAMING KEYBOARDS

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Corsair	Strafe RGB	16,999
Corsair	K70 RGB	14,650
Razer	BlackWidow Chroma	13,145

TOP 3
CPU LIQUID COOLERS

Brand	Model	Price (in ₹)
NZXT	Kraken X61	19,295
Thermaltake	Water 3.0 Ultimate	15,141
Corsair	H110i GT	15,315

TOP 3
YOUTUBER MICROPHONES

Brand	Model	Price (in ₹)
Samson	Go-Mic	4,400
Blue Microphones	Snowball iCE	5,499
Sennheiser	ME 2	3,950

TOP 3
BLUETOOTH SPEAKERS

Brand	Model	Price (in ₹)
Bose	Sound Link III	22,388
B&O	Beolit 15	47,990
JBL	Xtreme	24,990

TOP 3
SPORTS IEMS

Brand	Model	Price (in ₹)
Jaybird	X2	15,999
Yurbuds	Venture Talk	5,999
Audio Technica	ATH-SPORT3	2,799

digit KILLER RIGS

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BASIC RIG

Mini-PC	Intel NUC NUC5CPYH	9,850
SoC	Intel Celeron N3050	0
Connectivity	802.11ac + Gigabit Ethernet + Bluetooth 4.0	0
Audio	Realtek ALC	0
USB	4x USB 3.0 + (Including 1x Charging capable)	0
OS	Linux	0
Power Supply	Adapter included	0
Mouse	Logitech MK220 Wireless (Bundle)	1059
Keyboard	Logitech MK220 Wireless (Bundle)	0
RAM	Crucial 4GB CT51264BF160B	1,450
HDD	Kingston SSDNow UV300 120 GB	2,949
Sub-total	(Excluding Monitor)	15,308
Monitor	LG 19M37A	5,210
Total		₹20,518

HTPC

Processor	AMD A10-7850K	11,075
Motherboard	MSI A88XM-E35	5,600
RAM	G.Skill RipjawsX DDR3 4 GB (2 x 2 GB) PC RAM (F3-14900CL9D-4GBXM)	1,997
HDD	Western Digital WD30EZRX 3TB	7,887
Graphics Card	AMD R7 (512 Cores)	0
PSU	Antec VP500PC 500W	2,900
Speakers	None	0
Optical Drive	LG GH24NSD1 SATA DVD Writer	935
Mouse	Logitech MK220 Wireless (Bundle)	1,059
Keyboard	Logitech MK220 Wireless (Bundle)	0
Sound Card	None	0
Monitor	None (your TV)	0
Cabinet	Corsair Carbide 88R	3,394
Total		₹31,453

ENTRY-LEVEL GAMING

Processor	AMD FX8320	11,336
Motherboard	Gigabyte GA-78LMT-USB3	4,190
RAM	ADATA AD3U1600C2G11-B 1600 MHz (2x 2 GB)	1,760
HDD	Seagate Barracuda ST1000DM003 1TB	3,591
Graphics Card	Sapphire R7 360 2GB	9,250
PSU	Corsair CX430 V2	3,099
Speakers	Philips MMS4040F - 2.1 Channel	3,016
Optical Drive	LG GH24NSD1 SATA DVD Writer	935
Mouse	Logitech MK200 (Bundle)	800
Keyboard	Logitech MK200 (Bundle)	0
Sound Card	None	0
Sub-total	(Excluding Monitor and Cabinet)	37,977
Monitor	BenQ RL2240HE	9,338
Cabinet	Antec X1-T Gaming	2,750
Total		₹50,065

MID-RANGE GAMING

Processor	Intel Core i5 - 6400 + Cooler Master Hyper TX3	16,049
Motherboard	ASRock H170A-X1	8,299
RAM	G.Skill Ripjaws 4 DDR4 F4-2133C15D	3,900
HDD	Seagate Barracuda ST1000DM003 1 TB	3,591
Graphics Card	Gigabyte GTX 960 N960WF2OC	17,950
PSU	Antec VP650P V2	4,350
Speakers	F&D W330X	4,600
Optical Drive	LG GH24NSD1 SATA DVD Writer	935
Mouse	CM Storm Devastator (Bundle)	2,559
Keyboard	CM Storm Devastator (Bundle)	0
Sound Card	None	0
Sub-total	(Excluding Monitor and Cabinet)	62,233
Monitor	BenQ RL2240HE	9,338
Cabinet	Corsair Carbide SPEC 01	3,499
Total		₹75,070

ULTRA HIGH-END GAMING

CPU + Cooler	Intel Core i7-6700K + Cooler Master Seidon 120V	31,549
Motherboard	Gigabyte Z170X Gaming 3	15,999
RAM	Corsair Vengeance (2x 8 GB) CMK8GX-4M1A2400C14R	7,100
HDD	WD WD30EZRX 3TB + Samsung 850 Pro 256GB SSD	18,386
Monitor	Acer XB270HU 27-inch 144Hz 4K G-Sync	61,300
Graphics Card	GALAX GTX 980TI HOF 6 GB	58,000
Cabinet	Cooler Master MasterCase 5	9,249
PSU	Antec HCP-1000 Platinum 1000W	16,750
Speakers	Logitech Z906 5.1	17,990
Optical Drive	LG Blu-ray WH14NS40 RW	5,999
Mouse	Logitech G502 Proteus Core	3,959
Keyboard	Steelseries APEX RAW	8,824
Sound Card	ASUS XONAR Essence STX	10,720
Total		₹2,65,825

PRIMARY DIGIT TEST RIG

| Processor	Intel Core i7 - 5960X (Extreme Edition)	81,699
Motherboard	ASRock X99E-ITX/AC	22,500
RAM	Apacer Panther 2666 MHz 32 GB (4x 8 GB)	15,840
HDD	Western Digital WD40EFRX	12,990
SSD	SanDisk Extreme II 240GB	34,000
PCIe SSD	Intel 750 NVMe + Kingston HyperX Predator 480 GB	119,275
Graphics Card	Gigabyte GTX 980 Ti Extreme Gaming	74,999
Cabinet+ Cooler	Cabinet (NA) + Noctua NH-D15	8,199
PSU	Corsair RM1000X	13,899
Monitor	LG 29UC97C	40,000+Tax
Optical Drive	NA	NA
Mouse	Mionix Castor	4,700
Keyboard	Corsair STRAFE	12,490
Total		₹4,40,591

SPEND SMART

Be portable with the best Ultrabook, or join the PC Master race with a high performance gaming motherboard. Here are the best prices for both categories.

ULTRABOOKS

Brand	Model	Processor	Screen	OS	Memory/Storage	Graphics	Weight	Price (in ₹)
Dell	Inspiron 11-3158	Intel Core i3-6100U	11.6	Windows 10 Home	4GB RAM / 500GB HDD	Intel HD 520	1.39 kg	42,590
HP	Pavilion 11-n109TU x360	Intel Core M-5Y10C	11.6	Windows 8.1	4GB RAM / 500GB HDD	Intel HD	1.40 kg	42,990
ASUS	ZenBook UX305FA	Intel Core M 5Y10	13.3	Windows 10 Home	4GB RAM / 256GB SSD	Intel HD	1.25 kg	54,990
Lenovo	Yoga 500	Intel Core i7 5500 U	14	Windows 10	8GB RAM / 1TB HDD	Intel HD	1.80 kg	69,890
Dell	Inspiron 15-7568	Intel Core i5-6200U	15.6	Windows 10	8GB RAM / 500GB HDD	Intel HD 5500	2.17 kg	71,690
ASUS	ZenBook UX305LA	Intel Core i5-5200U	13.3	Windows 10 Home	8GB RAM / 512GB SSD	Intel HD 5500	1.25 kg	71,990
Apple	MacBook Air	Intel Core i5	11.6	Mac OS X	4GB RAM / 256GB SSD	Intel Iris Pro	1.08 kg	75,555
Dell	Inspiron 13-7359	Intel Core i7-6500U	13.3	Windows 10 Home	8GB RAM / 256GB SSD	Intel HD 520	1.63 kg	80,990
Lenovo	Yoga 3 14	Intel Core i7 5500 U	14	Windows 8.1	8GB RAM / 256GB SSD	Intel HD	1.60 kg	86,890
Acer	Aspire R 13	Intel Core i5-5200U	13.3	Windows 8.1	8GB RAM / 512GB SSD	Intel HD 5500	1.50 kg	97,000
ASUS	ZenBook Pro UX501JW	Intel Core i7-4720HQ	15.6	Windows 8.1	8GB RAM / 512GB SSD	GeForce GTX 960M	2.27 kg	1,16,999
Apple	MacBook	Intel Core M 5Y10	12	Mac OS X	8GB RAM / 512GB SSD	Intel HD 5300	1.00 kg	1,19,000
Toshiba	Portege Z30t-B X4301	Intel Core i5-5200U	13.3	Windows 8.1 Pro	8GB RAM / 256GB SSD	Intel HD 4400	1.36 kg	1,23,500
Lenovo	Yoga 900	Intel Core i7-6500U	13.3	Windows 10 Home	8GB RAM / 512GB SSD	Intel HD	1.29 kg	1,23,690
HP	Spectre x360 - 13-4013tu	Intel Core i7-5500U	13.3	Windows 8.1 Pro	8GB RAM / 256GB SSD	Intel HD 5500	1.48 kg	1,30,990
Dell	XPS 12-9250	Intel Core m7 6Y75	12.5	Windows 10 Home	8GB RAM / 512GB SSD	Intel HD 512	1.27 kg	1,49,990
Toshiba	Portege Z30t-B Y4301	Intel Core i7-5500U	13.3	Windows 8.1 Pro	8GB RAM / 512GB SSD	Intel HD 4400	1.40 kg	1,50,500
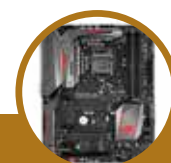
GAMING MOTHERBOARDS

Brand	Model	RAM	Chipset	Intel / AMD	Form Factor	PCIe x16 Slot	M.2 Slot	Sata Slots	Price (in ₹)
Gigabyte	G1.Sniper A88X	DDR3	A88X	AMD	ATX	2	NA	8	8,989
MSI	970 GAMING	DDR3	950	AMD	ATX	2	NA	6	9,050
ASRock	Fatal1ty 990FX Killer/3.1	DDR3	990FX	AMD	ATX	3	1	5	14,000
MSI	Z97 GAMING 5	DDR3	Z97	Intel	ATX	3	1	6	15,300
MSI	Z97 GAMING 3	DDR3	Z97	Intel	ATX	2	1	6	15,750
ASRock	Fatal1ty Z170 Gaming-ITX/ac	DDR4	Z170	Intel	Mini-ATX	1	1	7	17,499
ASUS	M5A97 R2.0	DDR3	970	AMD	ATX	2	NA	6	17,599
ASUS	MAXIMUS VIII RANGER	DDR4	Z170	Intel	ATX	3	1	8	18,770
MSI	X99A SLI PLUS	DDR4	X99	Intel	ATX	4	1	10	21,600
MSI	A88X-G45 GAMING	DDR3	A88X	AMD	ATX	3	NA	8	23,079
ASUS	ROG MAXIMUS VIII HERO ALPHA	DDR4	Z170	Intel	ATX	3	1	6	32,990
MSI	X99S GAMING 9 AC	DDR4	X99	Intel	E-ATX	5	1	10	35,580
Gigabyte	GA-Z170X-Gaming G1	DDR4	Z170	Intel	E-ATX	4	2	10	46,085

Thunderbolt 3 –
One port to rule them all

### The soon to be ubiquitous interface deserves your attention

Agent 001
agent001@digit.in

When Thunderbolt first hit the scene back in 2011 and only Apple decided to implement the same. It was rumoured to be a Mac only interface but Intel soon put those rumours to rest. One thing was obvious, the industry didn't seem to bother with the new interface. Not many devices were ready to move away from USB and adopt Thunderbolt. For a time it seemed that Thunderbolt would end up as the next FireWire – the last guy to fall in battle against the USB.

The aim was clear from the beginning, to create an interface that would serve more than one purpose. It would provide video data and raw data transfer, so it was only natural for the port to be chosen from the existing array of display interface. The first Thunderbolt was shaped in the form of the miniDisplayPort and thus, you could connect a display to it if required or hook up a storage drive. The DP was rigid and offered enough bandwidth – 10 Gbps – for high-throughput data transfers. But it was way ahead of its time. Mainstream desktop motherboards wouldn't dare add the extra Thunderbolt chip and lose out on market share since the extra chip would simply make things a little expensive (read up on licensing agreements to know why). At most, motherboard
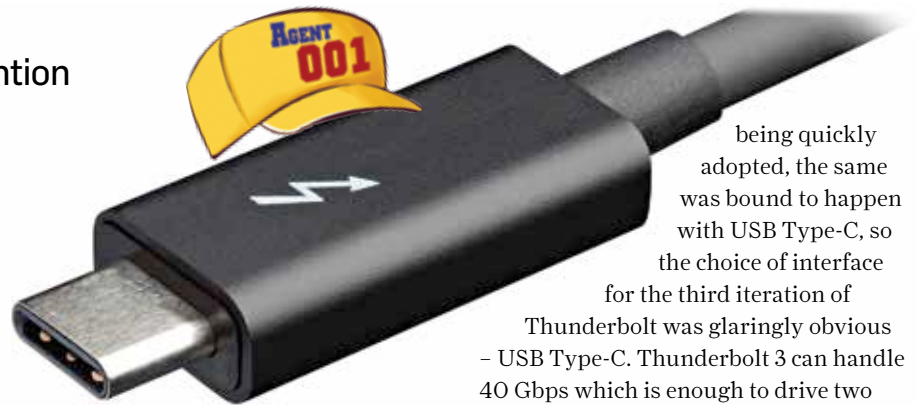
manufacturers would slip in a Thunderbolt AIC (Add-in-Card) header so that the user, if they ever needed could buy a Thunderbolt AIC and slap it on their boards. Needless to say, this approach of meeting things half-way didn't catch on and Thunderbolt 2 went the same way as Thunderbolt 1 despite showing promise. ASUS was the first motherboard manufacturer to adopt Thunderbolt 2.

Thunderbolt 2 had double the bandwidth of the previous generation but it required a lot of power which meant it couldn't be adopted onto portable devices. It allowed streaming 4K video back when 4K monitors were rarely available unless you had really deep pockets. So again, the port was way ahead of its time which prevented wide-scale adoption.

Which brings us to Thunderbolt 3. The time was now ripe, thanks to the advent of SSDs, existing data transfer protocols were already saturated and multiple new interfaces started popping up. For internal devices, there's SATA Express and M.2 (NGFF) and while the battle is yet to be won, it seems that M.2 will win the crown. For portable devices, USB 3.0 arrived and it was soon followed by USB 3.1 heralding the new USB Type-C connector. Since USB ended up

being quickly adopted, the same was bound to happen with USB Type-C, so the choice of interface for the third iteration of Thunderbolt was glaringly obvious – USB Type-C. Thunderbolt 3 can handle 40 Gbps which is enough to drive two 4K displays or one 5K display and with the ability to channel 100 Watts, more power hungry peripherals can be made portable. The average laptop charger channels less than 100 watts and 40 Gbps is enough to transfer a full-length 4K feature film in under 30 seconds.

And thus, thanks to USB Type-C, the Thunderbolt interface will now become truly popular. Every major manufacturer is adopting the USB Type-C connector, we started seeing it on not just premium devices but even extremely budget friendly devices like Mini-PCs that barely cost ₹9,500 rupees. Plenty of mobile phones have adopted the Type-C connector and so have laptops. In fact, between CES and Computex, we've seen Type-C being slapped onto everything under the sun. In the last month, we've even seen external graphics solutions like the Razer Core which uses a Thunderbolt 3 connector. While peripherals may be a little expensive at the moment, the rapid adoption will soon bring down costs. Thunderbolt 3 can be used to daisy 6 devices and you can even have a 4K display being the 6th device. So with Thunderbolt adopting USB Type-C as the port of choice, this could very well be the year Intel was looking forward to. Versatility is the name of the game and Thunderbolt 3 seems to have checked all the right boxes. 🄳

Budget graphics card

Hey guys, I have a query and it's very urgent so could you please help me out? I'm listing out my current configuration below, hope it helps:

- CPU - Intel Core i3 4130
- RAM - Kingston 4 GB
- Graphics Card - NVIDIA 9400 GT

I don't play a lot of games and it's most Counter Strike: Global Offensive that I spend my time on. And right now, I get about 50-110 FPS while running the game at 800x600 resolution. I am planning to upgrade my graphics card so could you suggest a decent upgrade? Here are a few other things you need to consider. I have a very small Intex cabinet and a cheap iBall SMPS which is the most basic one you can get. So I don't want to spend money on a GPU. I believe the 750 Ti is the best upgrade option, if so, which one do you think I should get?

I only want to play CS:GO so which is the best graphics card best suited for my configuration?

–Vijendra Baid

A Hey Vijendra, It's great to know there's a fellow Digit reader who also happens to be a CS:GO fan. After having considered all your conditions, it seems the GTX 750Ti is the best option for your. Since you currently have a NVIDIA 9400 GT and can run it absolutely fine, we can infer that your PSU can easily handle the 50 Watts that the card requires at peak load.

Small and powerful

A GTX 750Ti without overclocking and without external power connectors draws 60 Watts from the motherboard. So if you aren't going to hit peak load levels, then your current iBall SMPS should be easily capable of handling the load. So if you are looking for recommendations, the MSI N750 TI-2GD5TLP fits the bill perfectly. And every manufacturer has a SKU with the same specifications. So go to your local computer shop and ask for a 750 Ti without the external power connectors and buy the one which suits your budget.
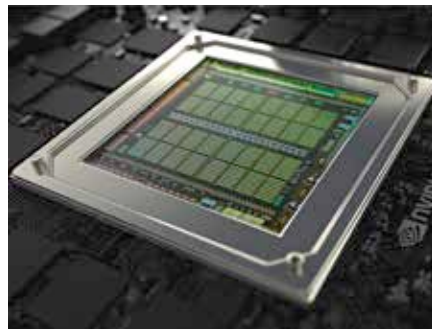
Portable gaming prowess

970M vs 980M

Hey Agent, I was thinking of buying a gaming laptop and I was looking at the gaming laptop series from Alienware and MSI. I wanted to know the difference between 970M and 980M graphics on laptops. Is it really worth paying extra for 980M over the 970M?

–Abhishek Gautam

A First of all, if you are serious about gaming, the same amount of money can get you a way better desktop configuration. Coming back to your question, the 980M is significantly faster than the 970M. It gives around 25-30 per cent better performance than the 970M. It can run Tom Clancy's The Division at 42 FPS on 1080p and the 970M gives 33 FPS at the same settings so the difference is considerable. With a price difference of around 20-25K between the two GPUs, it hardly seems worth the money but the GPU isn't the only difference between the two SKUs so if the remaining features seem to meet your expectations then a notebook with a 980M should be your choice for gaming.

Beginner DSLR

Hello Agent 001, I've just got to know from my parents that I'll be getting a DSLR for my birthday so what would you suggest I get? What are my options if my budget is around 25k? Please don't disappoint me, I'm counting on you.

–Satish Chinnasami

A Hey Satish, Within your budget you can get the 1200D from Canon or the D5200 from Nikon. The D5200 has a better ISO range, an articulated screen, 5 FPS continuous shooting and a 24 MP APS-C CMOS sensor. Moreover, with 39 focus points against the 9 focus points that the Canon has, it is much easier to work with the Nikon. Also, the fact that Nikon's F-mount has remained unchanged for decades gives you an array of lenses to choose from. You should easily be able to grab one for 25K along with the standard 18-55mm kit lens.

The Nikon D5200 is all you need

In search of IEMs

Hi Agent, I need a long-lasting pair of IEMs that won't cost me a bomb. Which ones do I suggest I consider for my next purchase? After my SoundMagic died, I bought a new pair of E10Ms which didn't even last for six months. Should I give the Synchros a try? Or something else with a mic?

–Pratham

A The E10M did look very delicate but the E10s I have seems to be working fine. Do you use the carrying case, etc. properly while stowing away in your bag / pocket? There was a guy interning with us whose JBL Synchros died on him fairly quickly. He also showed me that the reflective material on the cable vanished in a few months. I recently tried the M6 Pro. Can't really comment on the durability but they were nice. My gut tells me the M6 Pro is a good bet.

Restoring Steam games,
fixing network connectivity
and upgrades

It seems gaming has taken the centre stage

Q Fiddling with Windows Apps

I have windows 10 pro and I wanted to see where are the apps downloaded from windows store are located, after some search, I got to know that they are located at C:\Program Files\WindowsApps. I also searched and got to know how to open it. But when I opened the folder from which I wanted some resources, I saw a file named "resources.pri". I searched how to open it but in vain. I need your help. My computer has -
- Windows 10 Pro 64-bit
- Intel Core i3 3rd Gen
- 4 GB RAM
- Please note that the software should be free

–Adityan Singla

A Hey Aditya, Microsoft's Knowledge Base has a pretty detailed article on how to deploy and extract resources from PRI (packaged resource index) files. Since you've already figured out where on your hard drive these files are located, all that's left to do it unpack the archive using the official tools. Check out this link to figure out how to do that. http://dgit.in/UnpackPRI
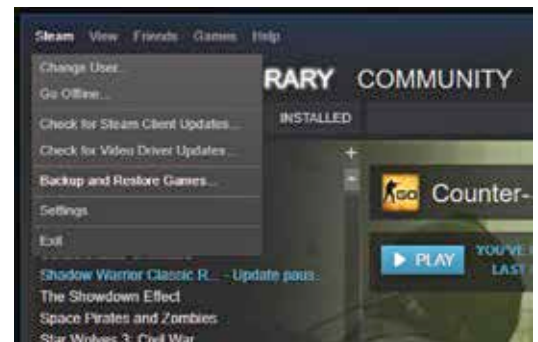
Q Cross platform backups?

I have a ton of games (mostly from Digit DVD's) but most of them are in .csd format. Can you please tell me how to install these games. I mostly use Mac OS X (Mac Desktop PC)and Linux Ubuntu (and WIndows 10 sometimes). I have read .csd folders are used by Valve Steam as back up store for games. So please tell me how to install games from .csd folders on all the 3 OS's. Really waiting to get started... !!

–Virat Chourasia

A Hey Virat, We include installation instructions for the games included in the DVD. Ideally, it's best to install the games which have been provided recently since you wouldn't need to download updates. Steam updates are sometimes known to run into a few gigabytes. We include

Steam backups are platform specific

Windows backups since it happens to be the most popular platform. The instructions to restore these game backups are fairly easy.

For a start, you need to have a Steam account. You can download the Steam client from their site and install it. Once done, fire up the Steam Client and you'll be given the option to either create a new account or login to an existing one. Pick the option accordingly.

Once you have gone through the process and are logged into Steam, navigate to the File Menu and click on 'Steam>Backup and Restore games>Restore a previous backup'. Then select whichever folder you wish to install the game in and keep hitting next. It'll take a few minutes for the backup to be installed.

If at all, there is a scenario where the game asks for a CD-Key to be entered, navigate to the 'Store page' of that particular game and install it. Once it starts download, cancel the download and then repeat the restore process. A new CD-Key will have been added to your account by Steam and then you can continue.

The process is the same for the other two operating systems as well so if we do end up giving backups of the same, you'll know what to do. Happy gaming! :)

Make sure you aren't doing anything illegal

Tips & Tricks

98

Be it Facebook, Youtube or Photoshop, we have some useful tricks for them all, and a primer on how not to forget anything.

Q&A

No multiplayer for you!

Hey! I am having trouble connecting to online games on my laptop. I've tried most games including those that require steam and the ones that don't (liked NFS) but I still can't seem to connect to any online server. I have a stable internet connection and can access the web on my laptop. I have disabled the firewall and uninstalled the antivirus but hard luck, it still doesn't connect. Help! (I can play online games on bluestacks if that's of any help).

Also, I can't seem to start a hotspot with my laptop. I've used tried using the following command:

```
netsh wlan set hostednetwork
mode=allow ssid="myNetwork"
key="1234567890"
```

in cmd but nothing seems to happen and also downloaded some apps to start a hotspot but surprise surprise, those didn't work either. Can the hotspot be fixed with a windows update? If so can you specify which one?

- Here's my configuration:
- Dell Vostro 14 v3446
- 4GB RAM
- Intel Core i3
- Windows 8

—Shivanand Pegu

Hey Sivanand, Has this been happening since you bought the laptop or did it start after a certain update or after installing any particular software? The easiest way to resolve this would be to reset the network adapter. Open a command and type the following lines.

```
netsh winsock reset catalog
netsh int ipv4 reset
netsh int ipv6 reset
```

If these don't manage to resolve your issue then you might want to perform a

Get a better graphics card first

clean install for the network adapter's drivers to solve the issue.

Also, there is the remote possibility that you might be a victim of a prank. Check your hosts file and ensure that there are no entries pertaining to Steam.

I need an upgrade!

Hey Digit. My name is Shivashankar and I am an avid PC gamer. Here is my PC specs.

- Windows 7 Professional 64-bit
- Intel Core i5-2320 quad core @ 3 ghz
- 10 GB RAM (2 GB G-Skill, 8 GB Corsair Value Select)
- ASUS nVidia GeForce GT 610 Silent 2 GB dedicated

My PC was an Acer Veriton OEM package bought a few years ago, then later on I changed the other 2 GB Apacer RAM which came with my G-Skill RAM and added the Corsair RAM and added the NVIDIA graphics card. I want to know whether my PC specs are good enough to play games released last year and the year before. The reason I am writing this letter is because I feel that my processor and graphics card is a bit weak. If my PC isn't capable, can you kindly suggest what all upgrades are needed to get my PC to play the aforementioned games in medium to high settings. I have about ₹50k to spend.

—Shivashankar S. Menon

Hey Shivashankar,
Your CPU is fine though it is on the brink of being a bottleneck. What really matters is the graphics card. The GT 610 is an entry level card and it resides at the absolute extreme end of the spectrum, so if you do want to run the latest AAA games, you should focus on upgrading your graphics card. Check out deals sites for a GTX 970, you can get it for as low as ₹22K which leaves ₹28K for the CPU, motherboard and RAM. So you can get a Core i5 6400 for ₹14K and then get an H170 motherboard for ₹9K or less and spend the remaining ₹5K towards getting 8 GB of RAM. If you can sell off your old RAM then you'll be able to get 16 GB of DDR4 RAM.

This configuration should ensure playability of AAA titles for at least 3 years at medium to high settings.

BROWSING
SAFELY
ON THE
INTERNET

We've come a long way in the internet revolution and among many other uses, the internet can also be used to harm you. Here's how to keep safe online in this internet driven world.

ILLUSTRATION: PRADEEP G. NAIR

Arnab Mukherjee
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The Internet - a wonderfully random, completely anonymous treasure trove of anything and everything you can possibly imagine. This of course includes treasures about you as well - your social media accounts, banking details, email IDs, even your identity. Go through this internet safety cheat sheet and get yourself prepared with basic internet safety.

Identity Theft
To prevent anyone from stealing your identity or taking over your social media accounts, take the following measures:

Strong passwords
A strong password is often the only thing standing between your online account and a multitude of hackers. There are a few simple golden rules to follow while making passwords -

- Don't be obvious. Password and 1234 shouldn't even be in the vicinity of your password.
- Mix letters, numbers and symbols.
- Make it easy to remember by relating it to something only relevant to you. Like d@rtBOarD is good if you love darts.
- Never repeat passwords. To remember many of them easily, use a base password and add to it for specific cases, like gM@1ld@rtBOarD for Gmail and @m@zONd@rtBOarD for Amazon etc.

Doesn't really work that way. Dictionary words are to be avoided!

- If you do have to write it down, please don't leave it on your desk or any other accessible place. And change your passwords regularly.

Don't Trust everything and everyone online
If a website appears shoddy or badly designed, check for telephone numbers, addresses and any other information that you can cross check in the real world to verify its legitimacy. Apply the same rules, or even stricter ones for people you speak to online - Don't give out personal information, keep to first names, and if you do agree to meet, do so in a busy public place and inform someone you trust of your whereabouts.

Beware of Phishing
Check every official email for legitimacy. Follow these steps to avoid getting caught in a phishing scam-
- Check the email ID. It often won't match or will be slightly altered from

the company it seems to represent.
- Never click links directly in such emails that claim that there is some problem in your account. Go directly to the website using their URL.
- Always check actual destinations of links by hovering your mouse over the link which shows the destination in the lower left corner of your browser.
- The company with whom you have an account will never ask for your credentials via email. Contact the company to check the email's legitimacy.

Don't get scammed

Don't click on the following types of emails or links or pop-ups or tweets or posts for your own good -
- Million dollar winning emails
- Mails inviting you to play foreign lotteries or card games.
- Emails with a long sad story followed by a call for help in order to transfer large sums of money or inheritance out of a said country.
  They are all as fake as fake can be.

Keep separate email accounts for work, home and any other use

Keeping separate email IDs not only helps you organise your emails better, it keeps the threats of one online aspect of your life away from the others. There are three basic types that you might need-
- Work - Any job related emails, appointments or anything official.
- Personal - Use this to correspond with friends and family, and also for banking, job hunting and other non-work related important issues.
- Junk - The one email to sign-up anywhere online - social media, restaurants, games, etc. You won't mind this one being overloaded with spam.

Beware of Cookies

Cookies are files that websites store on your device to keep information about you between sessions on that website. Usually they are harmless, but can also be used for targeted advertising or targeted scams by analysing your behaviour online. Here's how to deal with them -
- Set your browser to warn you before any cookies are installed. Most

browsers have a `Cookies` setting under `Privacy Settings`.
- Use an antispyware program that can scan cookies for tracking activities. Most antiviruses come with this feature.
- User browser settings or separated applications to delete old and unwanted cookies.
Firefox comes with built in support for this, and "CookieController", "Cookie Manager" for Chrome, and a host of others for any browser that you are using will do the job.

Trust your browser

Sometimes, going through the privacy and security settings of your chosen web browser can give you more security options than any third party or external solutions. Take some time and dig through them to choose what's right for your needs.

Connection Security

Even though you may be following the best practices regarding protecting your online identity, if your connection is insecure, you might as well kiss your online security goodbye. Hence, before you fire up your connection and do all those secure transactions, go through the following checklist-

Secure browsing

Check for a "padlock" or "https" right before the URL that you are browsing.

Cookie controller for Firefox comes with shortcuts that you can add to your toolbar from the Customise option

This indicates that the website has a valid security certificate from a trusted third party like 'VeriSign' and that the information being transmitted from that website is encrypted and won't be of any use to someone who intercepts it.

Use an antivirus, antispyware and a firewall

In today's world, going online without an antivirus is as good as mailing your personal information personally via post and then setting your computer on fire. There is good reason to keep these updated and activated on your system.
- Even the standard firewall on your OS is mostly secure enough.
- There are sufficiently good third party antiviruses and anti spyware available online. Dedicated internet antivirus are also available

Use Your Instincts

Technology might have come a long way in assisting and even exceeding us, but there is a strong reason that we cannot turn off our instincts in any situation that we face. Those instincts are equally useful on the online world as well. If anything sounds or seems suspicious, it is best to avoid it. For example, if the link you are accessing appears to have a lot of random characters, or the person you just started talking to sounds oddly insistent to know your birthday, it's best to listen to that spider-sense and skip this one! Although let us make it very clear, the internet is infinite in its potential and by no means do we want you to be wary of each click that you make. Combine just the right amount of caution and the handy tips above, and you're all set to unleash the internet into your life!

KEYLOGGERS

Keyloggers are a special type of program that, if running on your computer, track each and every key press on your keyboard. This, combined with your browsing history, can give a hacker crucial information about anything you do online and even offline. To avoid this, enter sensitive information through on-screen or digital keyboards available from the OS or from the website itself.

11 features you should try on the Android N

Google chose to show us the next version of Android earlier than usual
this year, and we're all over the Android N Beta right now.

Prasid Banerjee
prasid@digit.in

Another year, another version of Android. But things are faster this time. According to Google's Platform Versions page, Android 6.0 is currently at 2.3% distribution, while Lollipop has merely progressed to about 20% of the market. But, Google, in all its Search fuelled wisdom, thinks it's time for consumers to get a taste of the next version of Android. We don't know why Google decided to do this, but we sure aren't complaining.

The fact that there's a early preview for Android N also makes sense for developers. Google is basically giving them a chance to get their apps ready for when the actual release happens. As a result, many of the most popular apps may support features of Android N, right off the bat. Speaking of which, features like Split View and the revamped Quick Settings menu are good and there's a lot to like in Android N, but having spent some time with the OS, here are some things you may not have known.

Performance

Before you say it, we agree, it doesn't make a lot of sense to expect performance upgrades from a beta preview, but we couldn't help but run at least one benchmark. As expected, it shows no increase in the Nexus 5X's performance.

That said, we do sense some added smoothness about the UI. For example, opening the multitasking screen seems faster, and switching between apps by double-tapping the multi-task button is

Take full advantage of the split screen mode.

faster than we expected. It seems Android N will bring about UI refinements, even if it foregoes true performance boosts.

Night Mode

Cyanogenmod users will be familiar with the dark theme. In fact, OnePlus' Oxygen OS, which is very close to stock Android, also comes with the same feature. And now, finally, Android is getting it. So, you can go into the System UI Tuner and turn on Night Mode. You can also choose to program your phone to turn it on automatically at fixed times.

Auto Rotate Home Screen

Android N is recognising the fact that phones predominantly come with big screens today. Hence, there's a split screen view, which can be used in both vertical and horizontal modes. Interestingly, if you press the Home button while in horizontal Split Screen view, your entire home screen is also turned to the horizontal mode, with apps on four sides of the display.
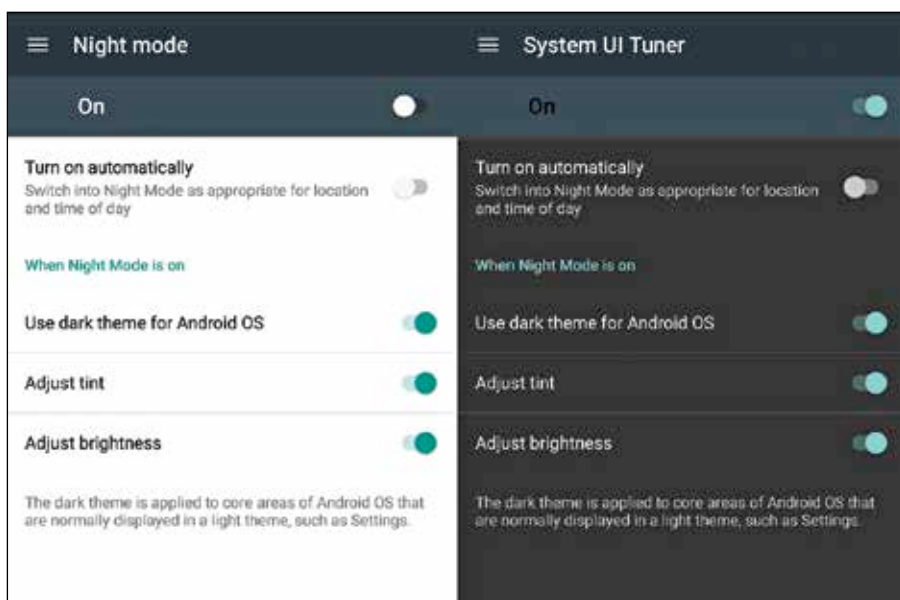
Android N finally adds a 'Night Mode', just like the ones on Cyanogenmod and Oxygen OS.
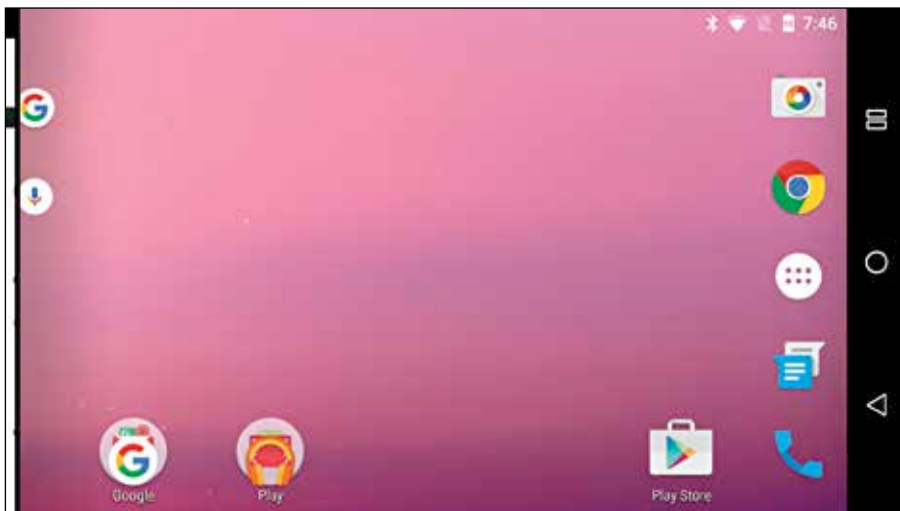
Your homescreen now recognises the orientation and rotates accordingly.

This could be a bug though, and may not be present in the final build of the operating system.

You can finally view the battery percentage on the home screen!

While this feature isn't turned on by default, you can go into the System UI Tuner and turn it on. To do this, choose the Status Bar option in the System UI Tuner and scroll down to Battery. Tapping on this option, you can turn on the 'Always show percentage' option. There are also two other options, including 'Don't Show this icon' and 'Show when charging'.

Time toggles

You can now have the time show in Hours, minutes and seconds format. Doing this will change the clock on the top left, showing the seconds ticking by all the time.

Easier split screen toggle

When using an app, you can go into the multi-tasking menu and drag apps to the two halves of the screen. You can also double tap the multi-tasking button to switch to the last used app. In case this seems like too much work to you, you can head back into System UI Tuner and choose the 'Enable Split Screen Mode' option. This allows you to swipe up from

the multi-tasking button to turn the Split Screen mode on.

Dragging across screens

Sticking with split screen mode. Imagine having WhatsApp open on one part of the display, while you browser through Chrome on the other. You may want to share a particular piece of text with a friend you're chatting with. You can do that on Android N, by simply dragging and dropping the text to the other window.

Note: Most apps don't seem to support this feature right now. We tried with Chrome and Hangouts, but the only skew that worked, was with the Play Store and Hangouts.

Pinning share options

Many phones try to do this automatically, but Google decided to give you control over it. You can now pin the most used share options to the top of the sharing bar, making for easier and faster sharing.

Emergency Information

Imagine you've lost your phone, and the person who wants to return it needs to know who it belongs to. They can't get into your phone when it's locked, but with Android N, they can swipe to the pin/pattern screen and check your emergency info from there. You can add the information yourself from the Settings Menu, by going into Users. It may also be useful in an emergency.

Cancel Downloads

Thank god Google noticed this one. Downloading apps off Google Play is fine, but if you've ever downloaded apks etc. on to your Android phone, you'd know that there's no cancel button when the Download Manager is running. Well, that changes now, with an added button right in the notifications bar.

Multilingual phone

Last but not the least, you can now have more than one language on your smartphone. This allows search records to be shown in both languages, which is something many would appreciate. It basically means your phone will know the languages that you know.
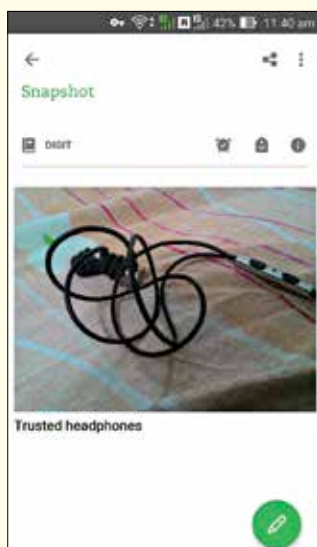
DON'T FORGET ANYTHING - TOOLS TO REMEMBER STUFF!

Let us be honest here - not all of us are good with remembering stuff now, are we? Thanks to the ever reducing attention span and hundreds of distractions (pff! Just excuses!), it is now way easier to forget that birthday, or miss you doctor's appointment, than it ever was. Before you get branded as an unsocial, unhealthy, and the worst - a forgetful person, check out the tips below on how to use a slew of smartphone apps and web based tools to never forget anything again.

Don't Forget Ideas

Inspiration, and sometimes Information, strikes at the most unexpected places and times. Maybe you had the best idea of your lifetime while you were on the bus, or discussed something brilliant in a meeting. But alas! When you actually need to recall the same, your treacherous mind has erased all traces of it. If only you had an effective note making tool that was both powerful and easy to sync. Guess what? You do.

The Smartphone app lets you take pictures within notes.

Tips & Tricks has its own page numbers, and does not follow the rest of the magazine's page numbers. This is done to ensure that you can cut out and save T&T in a separate folder for later reference.

Evernote comes as a desktop, web and smartphone app to take notes - textual, images, camera photos, handwritten. It also comes with a number of handy features to use checklists, reminders, tables, line tools, attachments, links to other notes, audio notes. You can even create notebooks to classify your notes and if you are a premium user, you can share your notes with other users. All of this can be done on all the platforms that we mentioned earlier.

If the number of features in Evernote feel like overkill to you, Google Keep is a much lighter note taking tool with the added advantage of syncing with your Google Account. Although Keep does not allow most of the business oriented features of Evernote, it is a no-frills note-making tool that has both web and smartphone app versions.

Don't forget bills

One of the major concerns every month is the timely payment of bills. Most of the utility bills these days have transferred to an online and sms based mode of notifications, and as a result, it is much easier to mistakenly ignore them. Unfortunately, utility companies won't consider that before disconnecting your internet or your power supply.

Most expense trackers like Walnut track any bill notification that is received via SMS and provide notifications when the due date is approaching. For email based notifications, Google Inbox does a good job of categorizing the bill into

Walnut itself is a powerful bill tracker complete with notifications when the due date is close.

Finances and reading into the email and the bill itself to highlight Bill Amount and Due Date.

Don't forget your health

How many times did you drink water yesterday? Or, How many times did you stand up and walk around between your work? It is no surprise that in this age of comfort and distractions, our own health ends up mostly forgotten. To address this, a number of smartphone apps out there have taken up the mantle to serve as basic
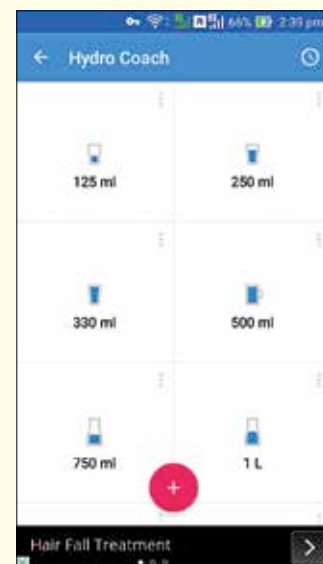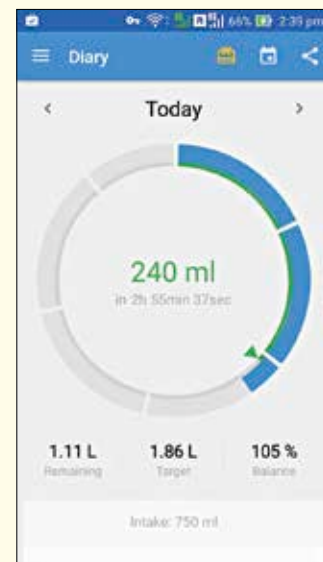
HydroCoach actually lets you know that it is disappointed with you for not fulfilling your daily goal.

reminder dedicated to one cause - be it maintaining a water level in your body or not staying still for extended periods.

Although there are a large number of apps available for tracking water intake, one of our favorites and the highest rated ones is Hydro Coach. Along with timely reminders, it allows you to sync data with fitness apps like Google Fit and S Health. Simply input your weight and age and your reminders will be on their way. There are a number of similar apps for other health targets, feel free to try them but verify the instructions from a medical source first.

Don't forget that random article you found online

There have been too many cases where I found a very

Pocket syncs almost real time and while you are online, downloads the saved pages.

interesting article online while I was browsing the internet furiously for some other purpose. Inadvertently I ended up losing the article to finish my work, or missed my deadline while reading the article. That was before I started using Pocket.

A really handy way to save articles and complete web pages to be read later, Pocket has both a web interface as well as a smartphone app. But it's true strength lies in its integration with 300+ apps as well as the useful extensions for most leading web browsers. So you can literally save to pocket from any device any time and read it later, even offline if you want to.\

Pocket also comes with social media integration which lets you see recommendations based on your friends and famous Pocket users whom you follow.

### Don't forget your passwords

The existence of the 'Forgot Password' link at every online logon screen is a testament to how easy it is to forget passwords in this age of a hundred online accounts.
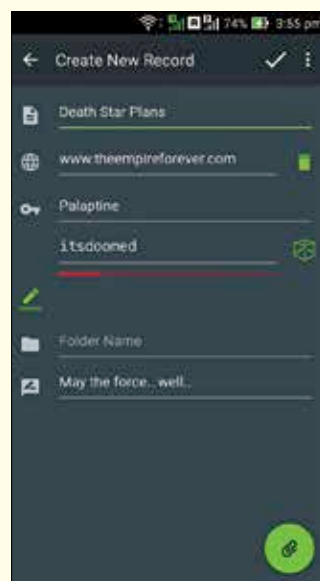
Very handy if you are an evil megalomaniac whose masterplan for an interplanetary WMD gets stolen every time.

In some cases, you can just go around and create a new account, or even use the Forgot password feature. But sometimes, even that is a pain to use. That is where the role of password management apps comes in.

Typically, handing over all your online credentials to a third
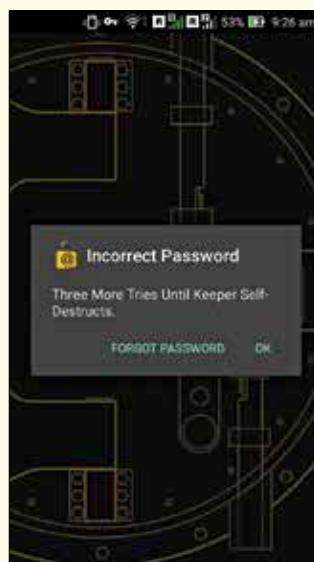
3..2..1...boom!

party might sound like something only a madman would do. But most of these apps come with high-end encryption and have been trusted since quite a while. Take Keeper Password Management. Apart from the standard password saving alongside an account name, Keeper offers two-factor authentication, cloud backup and can also verify your identity via your wearable device. The attention to detail in this app is what makes trusting it easier. Not to forget, it even self-destructs if you input the master password incorrectly more than 5 times.

Don't forget the birthdays

Thanks to Facebook, whatever dedication we had towards remembering birthdays is almost non-existant now. And god forbid if the person is clever enough to remove their birthday from Facebook days before the date, you are doomed to forget it!

Even though Facebook has removed support for exporting birthdays from the friend-list last year, there are still a number of very useful apps that work well with manual entries. Birthdays For Android is one of the highest rated apps out there and it can directly work with your contacts.
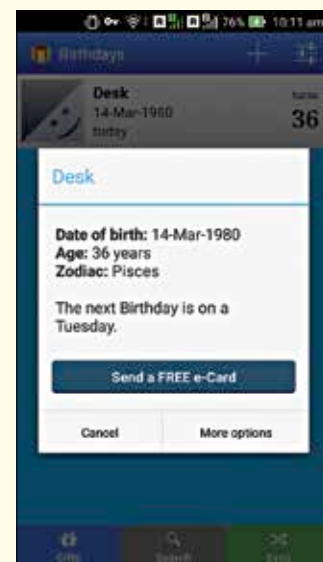
Birthdays for Android can also send free e-cards for you!

If you keep your contacts synced via Google, Google Calendar is the best event catalogue for you. Track birthdays and any other event that Google can

Material design makes the tracking all the more pleasant.

detect from your emails and contacts with the added advantage of Google's synchronisation.

Don't forget to turn off the thermostat..or pretty much do anything

Few applications have contributed more to easy automation

Anyone who can use all the channels for the DO button shall be the true universal master of Automation.

than the solutions from IFTTT. DO button is another such solution that allows you to perform a wide range of tasks by just tapping a button on your smartphone. After connected the channels and setting up the recipes, all you need to do is swipe between the buttons and tap away.

Perhaps the most difficult thing to do with this one is to choose which recipe to add! With countless channels to add with multiple actions for each channel, now the only reason you can forget to turn off that thermostat or switch off the wifi is your own laziness!

Don't forget your phone

Lost your smartphone? Or can't remember where you kept it? Don't panic. The first step in this situation regardless of what smartphone you are using is to head to the nearest internet browser.

For Android users, just log in to your Google Account and google 'Find My Phone', and Google will return the location of your phone accurate up to roughly 50 metres. You can also use the "Ring" feature to find out the location in your immediate surroundings.

For iPhone users, Apple has taken this a step further with the 'Find my iPhone' feature, which needs to be enabled explicitly on an iPhone. To do that, navigate: `Settings>Privacy>LocationServices` and ensure that the `Location Services` toggle is enabled. Navigate to `System Services` and toggle the `Find My iPhone` switch to 'on'.

To track it, Log in to iCloud on a Mac or a PC or use the 'Find My iPhone' app on another
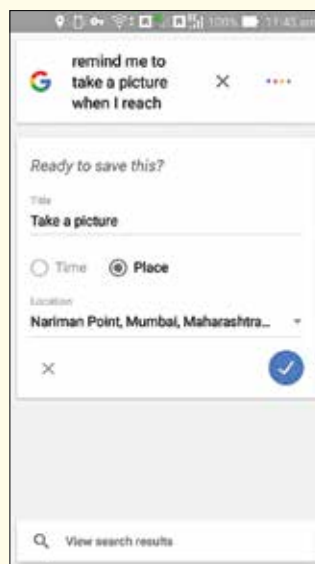
Along with location based reminders, you can also set time based and contact specific reminders, all with a few voice commands.

iOS device. Select your device and click on `Find My iPhone` to see it's location on a map. Turn on Lost Mode to track its location in the last 24 hours.

Don't forget to ask Siri..or Google Now

When you have a personal assistant built into every smartphone right now, it is really unacceptable to be forgetful. All it takes is one small instruction to your

favorite (and perhaps only) virtual assistant and you have a reminder ready - based on location, timing and even more.

There you go, now you really have no new excuse to be forgetful about mostly anything in your day to day life. Unless you bookmarked this Tips and Tricks section to be read later and then forgot about it. If you didn't, then do let us know if we forgot to include anything here. Happy Remembering!

YOUTUBE

We all encounter YouTube videos daily. Some of us are extensive users who like to spend entire day sitting back and streaming videos. While others might be dedicated YouTube uploaders. If you are any of such extensive users try these YouTube hacks to make the most out of your YouTube experience.

Try the YouTube Center

YouTube Center is aimed at improving the overall experience of YouTube including faster buffering. It is loaded with glut of features such as ability to download videos while you are watching, removing advertisements, DASH playback, etc.
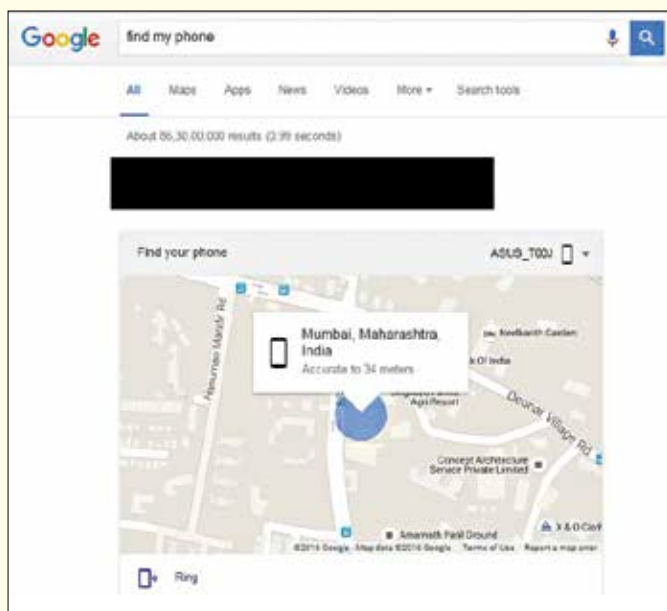
The Ring feature is very useful if you're really really lazy too.

The download button showing different video qualities is the real download button.

YouTube Center is available as user script, Firefox plugin, Opera and Safari extension. The Chrome extension is currently taken down and is currently being reviewed by Google.

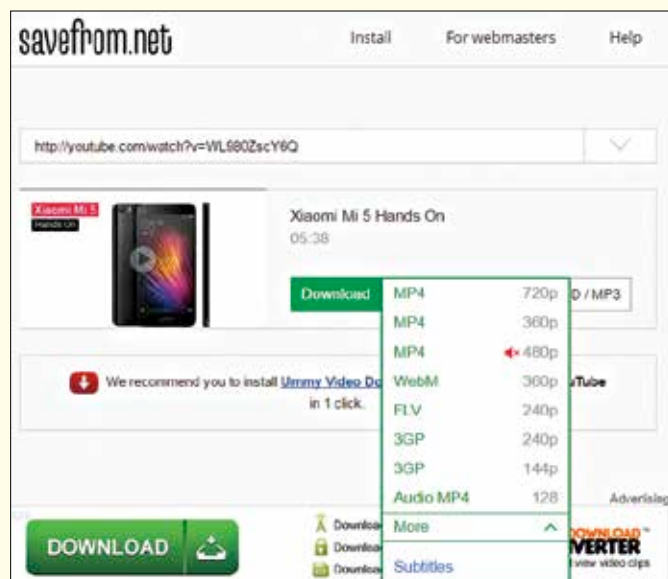Download YouTube Center from https://github.com/YePpHa/YouTubeCenter/wiki for your browser and you are good to go.

Download YouTube videos without download manager

If you're not using YouTube Centre there's a neat way to download the videos without the need for any download manager. To do this just add "ss" between "www" and "youtube". For example rewrite this link "https://www.youtube.com/watch?v=WL980ZscY6Q" as "https://www.ssyoutube.com/watch?v=WL980ZscY6Q" and you'll be redirected to "savefrom.net" from where you can select the download quality and start downloading the videos directly.

Share trimmed videos

Sharing a part of the video has always been a painful task. This easy trick will let you do it in seconds. Copy the following URL and replace the parts according to your requirement.

http://youtube.googleapis.com/v/[video ID]?start=[starting seconds]&end=[ending seconds]&version=3

Replace "video ID" with the unique video identifier from the original URL. "starting seconds" and "ending seconds" is the time duration that you want to share. Note that if time is in minutes or hours you should convert it to seconds first. The "version=3" in the URL is equally important otherwise the video will continue playing after the ending time.

For example the following link "https://www.youtube.com/watch?v=WL980ZscY6Q" can be shared as "https://youtube.googleapis.com/v/WL980ZscY6Q?start=10&end=30&version=3".

Note: Make sure you use "https" and not "http".

Play non-playlist videos as playlist

If you follow a particular You-tuber you'll never like to miss any of his newly uploaded videos. If you don't want to search for his new addition just follow this trick. Add "&list=UL" at the end of any video from his channel and you'll be presented with a meta playlist containing all the videos from him in chronological order. For example write this link "https://www.youtube.com/watch?v=WL980ZscY6Q" as "https://www.youtube.com/watch?v=WL980ZscY6Q&list=UL"

This trick also comes handy in the case where the Youtuber doesn't have a playlist.

Use shortcut keys

You must have witnessed that YouTube doesn't use standard shortcut keys for video play-back. We all are used to pause video by hitting the spacebar, however, YouTube decides to deviate from these standards. It has its own set of shortcut keys which you need to know.
• K - Pause/Play
• J/L - Back/Forwards 10 seconds
• Left/Right - Back/Forwards 5 seconds
• F - Fullscreen
• M - Mute
• Buttons 1-9 - Navigate through the video
Once you are into the video

Drag the mouse or use the nav buttons to watch in 360 degrees.

(in fullscreen mode or have clicked anywhere in the player) you can use spacebar to pause your video.

Watch 360-degrees video

If you are unaware YouTube has started accepting 360-degrees videos since last year. Google Chrome readily supports 360-degrees video but some versions of Firefox don't. For Firefox to support YouTube's 360-degrees video you need to tweak the browser. To do it, type "about:config" in the address bar and hit enter. Search for "media.mediasource.webm.enabled" and change it to "true".

This been done you'll be able to watch 360-degree videos. Pan through the video by dragging the mouse. Additionally, 360-degree videos also support Android and iOS. Compiled with the ability to make the most out of the gyroscope you can tilt your smartphone accordingly to pan the videos.

Try TV version of YouTube on your PC

You can now get TV version of YouTube on your PC. If you are a fan of the neat and minimal TV interface try this trick. Instead of firing "youtube.com", use "youtube.com/tv". Sit back, relax and use this UI to control YouTube using your keyboard.

Use arrow keys to navigate and enter key to play it. Addi-

Try the clutter free UI.

tionally, hit S key for search and G for guide. Sadly, like TV you cannot use your phone to search faster and queue videos.

Try advanced keyword searching

Apart from the straightforward basic search queries YouTube supports some advanced search options to get you closer to your results. This comes handy when you want to find a video but don't remember the exact title. In such case you can search using keywords. To do this, type "allintitle:keyword1 keyword2". For example, search for "allintitle:coldplay thrones". This will return all the results having the keywords "Coldplay" and "Thrones" in the title.

You can also search for videos that do not have a specific keyword. To do this, type "your search query -keyword" For example, search for "rainbow six siege -xbox one". This will return all the Rainbow Six Siege videos filtering the videos related to Xbox One.

Watch YouTube videos while using other sites

Most of us wish to watch YouTube while using other sites. Sort of like a picture-in-picture mode which is common in quite a few high-end televisions. While this feature is not officially offered by YouTube you can get this feature with a Chrome extension called "Floating for YouTube" from http://dgit.in/FloatYT

After adding it to Chrome you'll see a "pin" button on hovering over the video thumbnails. Additionally, the default YouTube player also shows "pin" button at the bottom corner. Click on it and the video will float in your browser. You can keep using other websites while the video plays in the corner.
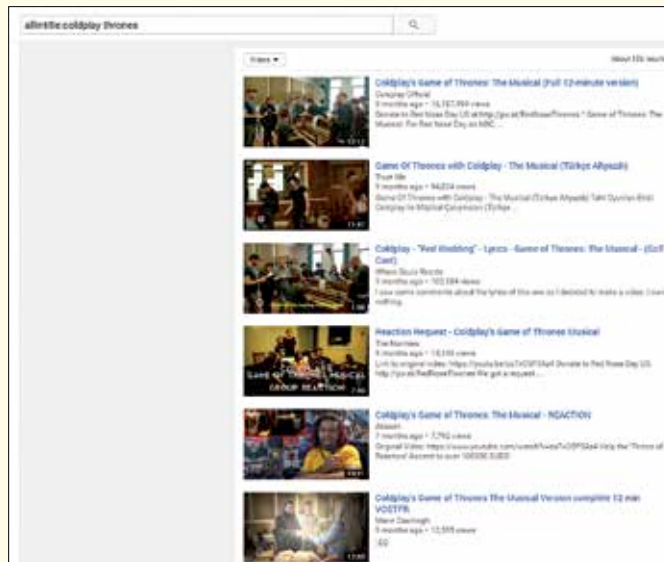
Gets me the exact Game of Thrones video I am looking for.

Bypass age restriction without signing in

Restricted videos necessitate you to confirm your age by signing in before watching the video. Although this may not be a common issue, in case you encounter this error there are two ways by which you can bypass age restriction without signing in.

To do this, just replace "watch?v=" in the link with "v/". For example, rewrite this link "https://www.youtube.com/watch?v=07FYdnEawAQ" as "https://www.youtube.com/v/07FYdnEawAQ" to watch the video which was restricted for you earlier.

The second way in which you can bypass age restriction is by adding "nsfw" before "youtube.com". For example, this link "https://www.nsfwyoutube.com/watch?v=07FYdnEawAQ" will take you to a new site that will let you watch the age-restricted video.

The site offers a button called "Bypass YT login" which you can add as bookmark. It's a javascript that will bypass YouTube login on the official website. Thus, when you are asked to sign in just hit this bookmark and you'll see your video.

Easter eggs

Change video progress bar's colour

While watching the video in full-screen mode type "awesome".

Play missile game

While watching the video type "1980" which will launch Atari's classic 1980 console game "Missile command".

Beam me up scotty

Star Trek fans write "beam me up scotty" in the search bar.

Watch video in comic mode

Add comic filter to any video by adding "&pow=1&nohtml5=1" at the end of the URL.

Watch ponies walking

Search for "ponies" and watch little ponies prancing happily across the screen.

PHOTOSHOP

Photoshop has been the most handy tool when it comes to any photography hack for years. With a new version releasing every year, this super colossal photo manipulating tool packs new features intended for the ease of use. We handpick some best tricks that will enhance the way you used Photoshop. Check them out.

Use the history states

By default the layer visibility cannot be altered using undo/redo. If you have tried to "Ctrl + Alt + Z" to undo the layer visibility, we are sure you have failed. Photoshop does offer this feature but is disabled by default. To enable this feature you need to tweak setting from the History panel. If you don't see History panel go to `Window` menu › enable "`History`". In the history panel, click on the submenu icon (located at the top-right corner) › `History options` › Check "`Make layer visibility changes undoable`".

Also we recommend you to increase your History states (by default: 20) to more. To do this go to, `Edit menu` > `Preferences` > `General` > `Performance` > `History states`. Change it from 20 to whatever you like. (max. 1000).

Quickly Export a layer

Exporting a single layer from your Photoshop Document was a painful task until Adobe releasesd Photoshop Creative Cloud 2015. With Photoshop Creative Ccloud 2015 this option is natively provided. In order to get quick export option first choose the desired export format by navigating to `File` > `Export` > `Export preferences`.

Once that is done, right-click on the layer you want to export and you'll see an option "`Quick export as`". Click on it, enter file name and you are done. Alternatively, you can quick export from `File` > `Export` > `Quick Export as`.
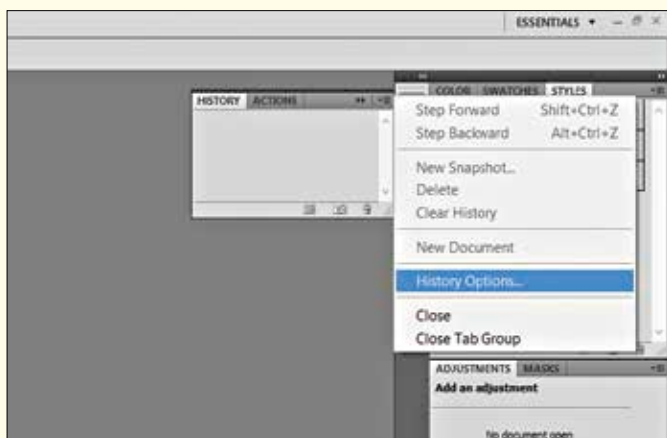
The top-right corner icon (horizontal lines) will take you to the right submenu.

Insert Dummy Text

If you are a UI designer this must be the top craved feature on your list. Adding a dummy text is must when you are designing an user interface. Earlier, you had to copy paste some text from the internet to serve your purpose. However, the newest feature in Photoshop lets you do it within few clicks.

To do it, select the `type` tool and drag a textarea in your document. Now go to `Type > Paste Lorem Ipsum`. This will automatically fill your text area with dummy text.

Process multiple photos at once

Photoshop power users who need to batch process multiple photos with same settings should use this trick. This neat feature in Photoshop offers you to apply same effect/settings to multiple photos in a single click.

To do this, make sure you have all the photos that you want to process in the same folder. Then open an image from it. Go to `Window>Actions` and record an action you want to do on all the photos. Once that is done go to `File > Automate > Batch >` select the option you just recorded `> OK.` Photoshop will process all the photos in the folder with same action.

Use the bird's eye view

If you are working on a project where you need to zoom in and zoom out constantly you should make use of this quick trick. Called as bird's eye view, it is introduced since Photoshop CS4. If you are zoomed into a particular area on a photo and want to navigate to another area, you can either zoom out, navigate and zoom in to the area you want or while zoomed in press "spacebar" and pan to the area. Both these methods require too many keystrokes. Instead use bird's eye view.

While zoomed in press and hold "H" key (the cursor will change to hand) and then click and hold anywhere on the canvas with your mouse. This will zoom out the entire canvas and you'll see a small rectangle near your cursor which denotes the area you were zoomed into. If you want to zoom into a different area, keep holding the mouse, drag the rectangle to a new area and release the mouse and the "H" key.

Changes made to one window will be reflected into another.

Get one image in two windows

If you want to refer a part of image i.e. go back to that particular image over and over again while doing your work then you can open the same image in two windows. This will cut down your job of zooming in and out every time. To do this, open an image and go to `Windows > Arrange > New Window for.` This will create a new window for your image which won't be floating. To place it side-by-side navigate to `Windows > Arrange > 2-up Vertical.` Now use one of the image as a reference as you go by doing your work with much better efficiency.

Delete tourists from photos

Taking a picture of a monument without the tourists around is impossible. However, with this smart photoshop trick you can easily remove tourists from your photo in few clicks. For this you'll need to set your camera on a tripod and take pictures every 10 seconds until you get 15 such photos.

In Photoshop navigate to `File > Scripts > Statistics.` Select "`Median`" for the stack mode and check "`Attempt to automatically align sources`". Click on "`Browse`", select all the 15 photos and click on "`OK`".

With the use of smart image processing algorithms Photoshop will process the static background and removes only the things that were changed in all the photos (moving people). In some cases you'll have to manually clean the leftover lingering limbs.

Save each layer as a separate PSD

You can save each layer as a separate PSD file using a builtin script which is available in all the recent versions of Photoshop. Go to `File > Scripts > Layer comps to files > Set a name`, select destination, and choose file type to `PSD`

Manage quick export settings from export preferences.

> `Run`. Now you'll find all the generated PSDs in the destination folder.

You can use the same method to save each layer as an image file by choosing JPEG/PNG under the file type. Additionally, you can also save only a single layer by first selecting it and checking "Selected layer comps" option only.

Use the new guide layout

Photoshop CC 2015 adds a new guide layout aimed at easily customising the grids for better and proper alignment. To use it navigate to View > New Guide

Export to any file format.

Layout > set the row and column spacing > OK. With this you'll see some guide lines appearing on your canvas.

FACEBOOK PRIVACY

Most of us daily spend a significant amount of time using Facebook where we often compromise our privacy for a new feature. We take the "seen" timestamp, advertisements, ratings, and sponsored posts for granted. Although these elements are the integral part of the UI you still can treat them as an option. To know how? We compile a curtailed list of all the tricks to enhance your Facebook privacy and we're pretty certain that there will be something or the other you might have missed out.

Remove Facebook ads

You must have seen the obnoxious side boxes full of advertisements which you might not want to see. Although Facebook offers a close button to close these boxes, it is not a feasible way to get rid of these advertisements. If you have tried AdBlock Plus you must be knowing it doesn't work with Facebook. To deal with this problem the popular anti-advertisement tool AdBlock has released a standalone tool for Facebook called "Facebook Customizer" in the form of Google Chrome Extension.

Facebook Customizer is aimed at removing the sidebar boxes, requests to rate movies, music and TV shows, and the sponsored clutter. Get it from "facebook.adblockplus.me". You first need AdBlock Plus installed into Chrome for Facebook Customizer to work.

Remove read receipts in Facebook messenger

We all hate the "seen" acknowledgement which Facebook adds under a message after it is read. While Whatsapp natively offers an option to turn off the blue ticks, there's no such option for Facebook Messenger. However, you can still get rid of these timestamps.

"Facebook Chat Privacy" is a Chrome Extension which will block any "seen" and "is typing" footprints and connections in Facebook chat. You can download it from here http://dgit.in/FBChatPriv

Unclickable profile picture

If privacy concerns you we will recommend you make your profile picture unclickable. By doing this no one will able to like,comment, and download it. To do this, login to Facebook, go to your Timeline and click on your profile picture besides your name. After your profile picture opens click on the small globe icon located on the ride side of the page below your name and next to the date you uploaded the picture. Select "Only Me". This will prevent anyone from clicking on the profile picture.

Log out of unused apps

Facebook privacy checkup allows you to know your privacy better and also provides you a handy tool to logout of all the unused apps and browsers that you might have forgotten.

Head over to this link https://www.facebook.com/help/securitycheckup and then

navigate to the following option "`Start Security Checkup`" > "`Review Logins`" > Check all the places that you don't use anymore > `Logout of All`. That's all there is to ensuring you have a little more privacy.

Keep a track on privacy

Most of the times you are unaware about the visibility mode of a post that you are posting. You need to double check whether it is visible to the right

Click on the icon highlighted in red.

audience. If you don't want to explicitly deal with it you can use a Chrome extension or Firefox addon called "Facebook Privacy Watcher".

The basic idea of Facebook privacy watcher is to colorize every element in your Facebook window depending upon the sharing type. For example, this plugin adds a green background to all the posts that are shared publicly. Thus, it becomes easy to recognise the sharing type by just looking at the post. You can download Facebook Privacy Watcher from here http://www.daniel-puscher.de/fpw/

Without Facebook Customizer (right), with Facebook Customizer (left).
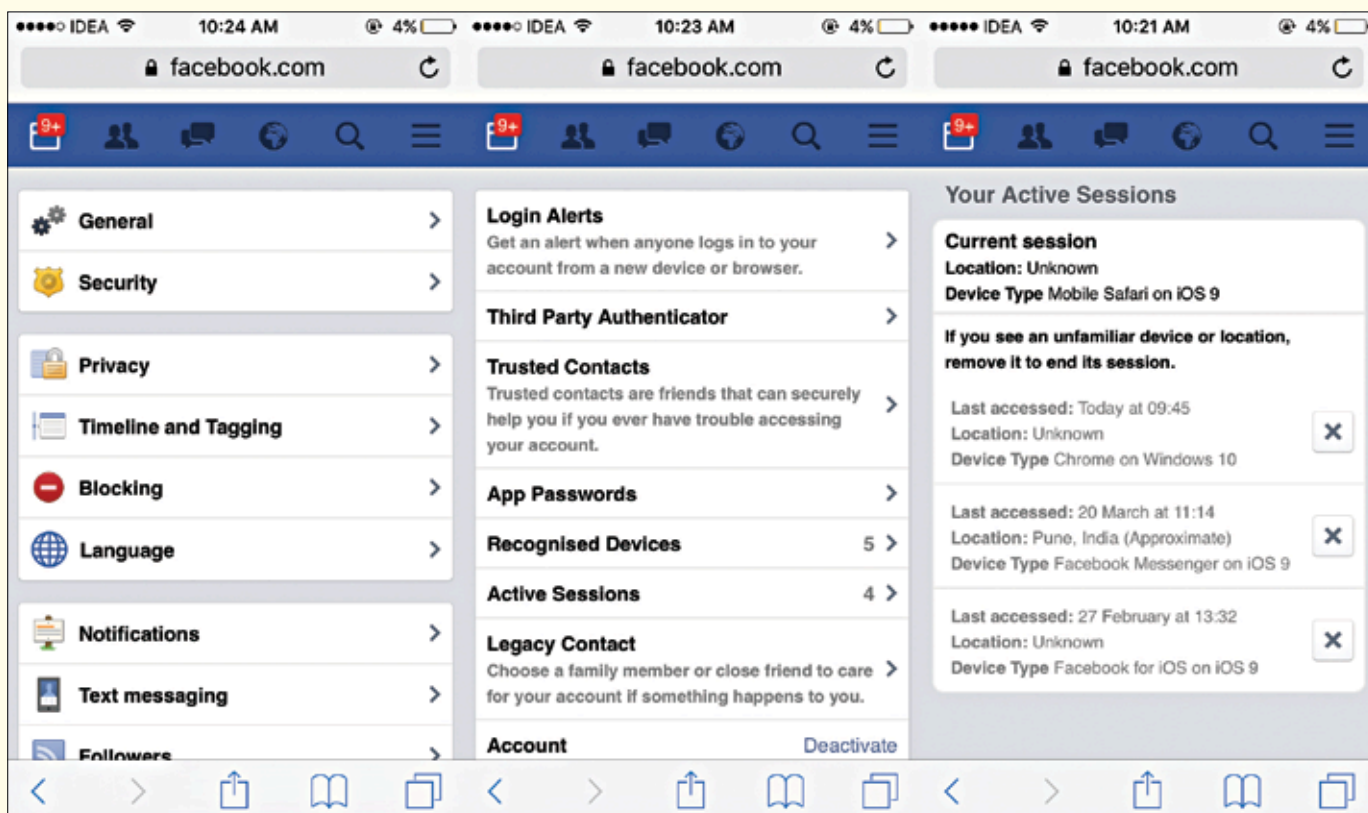
Go to the "Active Sessions" from the menu.

Block game requests

We all have that one annoying friend who sends us "Candy Crush" game invites. Thankfully Facebook offers a way to easily manage these invites. To do this, login to Facebook > go to Settings > Blocking. The "Blocking" page offers multiple ways to deal with these invites. One way is to "Block app invites from" which allows us to add the people who send you these annoying requests. The other way is to "Block apps" which allows us to add app names that you don't want to receive an invite from.

If you add a name of the person under "Block invites from" then you'll not receive any app invite sent by that person. On the other hand, if you add an app to the "Block apps" you won't get the invitation of that particular app from anyone in your friendlist.

Setup legacy contact

Facebook lets you designate a "legacy contact" that can take control of your account after your death. It's a newly introduced security option that allows a trusted family member or a friend to make one last post. Additionally, the legacy contact will be able to download an archive of the posts, manage friend requests, update the cover and profile picture. He isn't allowed to see the private messages of the deceased.

To do it, login to Facebook > Settings > Security > Legacy Contact. Add a name of your family member or a friend here. If you don't want anyone to take care of your account you can check the option under Account deletion that states your account will be deleted after you have passed away.

Remotely logout using your mobile

We find this feature convenient as it lets us monitor if we have left our Facebook account logged in back at our workdesk. This feature is built right in the Facebook (also app) which allows you to see the current active sessions and logout of each of them.

To do it using the app, open the app > navigate to Settings > Security > Active Sessions. Here you'll see a list of all the places where you are currently logged in. Tap the "X" button next to it to logout of the place.

To do it using the mobile website, login to your account from your browser > go to Menu (three horizontal lines button) > Account Settings > Security > Active Sessions. Tap the "X" button next to the session that you want to logout.

The post is highlighted in blue indicating "Custom" sharing.

Tech @ Work

110 **Smart SoHo**
Setting up your website isn't just enough, you need to secure your website against malicious elements on the Internet.

113 **Industry Connect**
Open Source on Mobiles, a social network for travellers and understanding why there are so many ZenFones.

Become a successful YouTuber

This is how you can make videos and be the next YouTube Star

Nikhil Punjabi
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We all hate the work that we do, at some deep subconscious level, don't we? We all have bills to pay, forcing us to endure the 9 to 6 grind, isn't it? If given the choice, we'd all do what our hearts desire and live happily ever after. All of us have read enough fairytales to hope and believe it's all going to work out in the end. That we will live and earn our living by our own rules, by and large. What if we said that you can unlock your fortune by making... videos? Yes. This is no fairytale.

According to Forbes, in 2015 PewDiePie made US $12 million and the internet went all crazy over it. Who or what is PewDiePie? He's a YouTube sensation. You would wonder if it's actually possible to make this much money just by uploading videos and get famous, too! Well, it's time to produce and shoot your own fairytale. On YouTube no less.

Of course, you know that YouTube is the world's largest video hosting and video sharing website, largely dictating Google's internet video streaming market-share, and while Facebook is fast catching up, YouTube still remains the champion.

"The Indian YouTube market is just exploding now and if you are interested in this space, you need to start. Start small, don't overthink stuff, just start making stuff and have fun. YouTube is all about having fun", believes Sapan Verma of East India Comedy.

Getting started
YouTubing being one of the newer and 'cooler' professions, doesn't mean you need not be serious about it. However, don't just start making videos without a plan. You need to be passionate about what you will be doing and you need to ask yourself a few questions. Why am I doing this? What is it that I have to contribute, and others don't? How is my content going to be unique and distinguished from the rest? Be clear about what

you're creating and communicating, and how, otherwise you will end up nowhere on this platform. There is no harm in borrowing inspiration from successful YouTubers, but blatantly copying them is not going to take you anywhere. It's all about creating an online video identity, for yourself and your YouTube channel. Think about this long and hard.

Once your vision and aim are in place, you can go ahead with setting up your Google account along with your YouTube channel. Alternatively, if one of your friends or someone you know is already into making videos for YouTube, you could also join them to get some hands-on experience first.

Hanu Dixit, singer and a budding YouTuber believes, "You should love to create and love what you create, you will automatically grow faster."

Getting on to making those videos
The most fun part of your job, which is also the most hectic, is to create videos.

Well in the three phases of making any video, pre-production and post-production are the most time consuming and require maximum planning. The production phase where you actually shoot the video isn't that difficult if everything is taken care of during the planning. In the pre-production phase, you turn your idea into a script which further evolves into a storyboard that carries all the minute details of all the shots. You also need to figure out the technicalities, the combination of the camera and the microphone you would be using, lighting and the time of shoot and get your permissions sorted if you are planning to shoot at public places. Make sure you contact your editor or get some hands on experience with the editing software you would be using to get ideas on how your composition should be. Plan anything and everything you would do while producing and shooting the video but remember the list of resources you have. Do not fail to make yourself a timeline and follow it.

A smartphone with a decent camera is good enough to produce high-quality videos. East India Comedy's 'Wrecking God' was completely shot on an iPhone 5S and the difference is hardly noticeable. Sapan Verma says, "Young potential creators fail to understand that one does not need professional equipment and a studio setup to create good quality videos. All you need to know is how to make smart use of the resource available to you."

If you are creating videos that heavily depend on the audio, then that's the place which you will need to invest in. You can use an external sound recorder and hook up an external microphone if your camera supports one, or use a phone as your voice recorder and then patch the audio in post-processing using an editing software.

You can always ask friends, colleagues to help you out. Another way is making full use of exchange of services. If you know someone who can help you, don't hesitate to approach them. In return of their gesture offer your services as well.

Remember to start out with really simple videos. It can be as simple as sharing what you think about a particular

event instead of posting it on social media. Such videos are called video-blogs, vlogs in short and are quite popular on YouTube. Benji and Judi from *itsJudysLife* have over 1.2 million subscribers and their channel is full of videos with her vlogging daily about her activities.

Now, one more learning to pick up from here is consistency. To sustain in this field for a long time, remember that consistency is the only key. A number of channels die early and fail to sustain just because they lack consistency in publishing videos. YouTubers often have a fixed schedule of when they would be posting up new videos. You can start off

WORLD'S TOP 5 EARNING YOUTUBE STARS IN 2015 - FORBES.COM		
Channel	Earnings	Category
PewDiePie	$12 million	Gaming, Comedy, Vlogs
Smosh	$8.5 million	Comedy
Fine Brothers	$8.5 million	Entertainment
Lindsey Stirling	$6 million	Music
Rhett & Link	$4.5 million	Entertainment

by uploading one video per week and gradually even go up to three videos per week, depending upon the resources. At first, the growth in views numbers will be slow and you might receive negative comments as well, but you need to take them as feedback, avoid repeating the same mistakes and not get disheartened. Share and promote your channel as much as you can, and even if the numbers are low, keep posting videos for your first set of subscribers. Search Engine Optimization helps your videos to improve its display rank when searched for a related tag. It definitely plays a very important role in the entire discoverability of content and do not forget to apply the magic of SEO on all your videos.

Skills you would need
Sincere dedication and passion are key towards a successful career. YouTubing is not a career that requires any academic qualifications or certifications unless you plan on choosing a niche topic that is technical and requires academic research, of course. Other skills that you would need is to know how to operate a camera,

few basic tutorials on lighting (http://dgit.in/LghtTips), types of shots and camera placements along with audio settings and common linguistic tricks to keep the viewer engaged. Along with all this technical knowledge, you would also need to know various other skills related to the genre of videos that you choose to make.

In the case of staged shows, you would need a more fleshed out script along with a storyboard as compared to vlogs which are more casual. Budding creators love to stick indoors, at least for their initial ideas as they have complete control over the conditions. Once you gather some experience of producing a few videos, you would want to move out and experiment.

"I shoot my own videos, I compose my own compositions, I edit the footage and add the effects. all by myself as I have negligible budgets and along with all of this I also manage my studies. It's actually fun," says Hanu, when asked about his shooting schedule and team.

For all your post production editing and corrections, get hold of a person who knows editing and would be willing to do it for you, or you could try out a couple of editing software yourself.

Build your channel
Once you have grown a small subscriber base for yourself and have been promoting your videos on all possible social media platforms, it's time to take a step further to gain more attention. If you haven't already added a channel banner and an icon, it's high time you get those sorted out. No one likes to watch or subscribe to a shoddy channel. Cosmetics matter. Having a welcome trailer for your audience always leaves a positive impact on them. If you are doing various genres of videos, it is advisable to make different sections and create playlists to make it easier to explore and keep the viewers engaged. Annotations and information cards are a few other ways you can use to redirect them to a similar video you want them to see.

For all your videos, choose intriguing titles along with custom thumbnails. Keep your video descriptions as informative as possible. Credits and all links go

IF IT WERE SO EASY WHY ISN'T THE DIGIT CHANNEL FAMOUS?

Good catch sir. Congratulations on your critical reasoning skills. Look, first of all, we're not saying it's easy. There are a number of reasons why the Digit YouTube channel hasn't been able to make it big. What went wrong? This article has made us put on our thinking caps too and after having spoken to so many of these YouTubers we've nailed down a few points we think we need to work on:

1. We're a magazine and website team first and a video team later. We are text content creators in the day and make YouTube videos on the side. Our day-to-day job (rozi roti as some would call it) is to populate the website and magazine. If from tomorrow, we dropped everything else that we do and just concentrated on making YouTube videos, we're pretty sure even our inherent camera shyness wouldn't stand in our way.

2. From the above point you'd wonder whether all of these YouTubers dropped everything (their day jobs, for example) and just started making YouTube videos one fine day. Of course not! They experimented in the initial days of YouTube by putting out videos that didn't adhere to "production quality" norms of today. But pretty soon when they realised that they're on to something, they jumped in with both feet. Keeping up with competition takes effort. If you look at our channel we were creating mobile phone reviews as early as 2010. That's 6 years ago! Were we too early? Not really. We just didn't commit.

3. Every YouTuber starts with average production quality and once you have your subscriber base in place, you need to up your game. Even though you'd have quality content up there, if your videos have just average audio and video quality, bounce-rates start skyrocketing. You end up losing audience at the crucial phase in the entire career timeline.

In the Mumbai office, none of us here are formally trained in filmmaking and thus to make sure we put out quality looking videos on YouTube, we are taking regular lessons by digging up the internet and watching videos on YouTube. Our team members have also been attending the workshop sessions at the YouTube Spaces in Mumbai to master this skill!

The above points are an honest analysis of our own predicament. If you are considering YouTube seriously you should make this 3-point analysis primer for yourself too.

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here along with all the information you wish to share. Make full use of the tags section by using all the tags and keywords that relate to your video as it helps your video be search friendly. Ensure all your videos have an intro, not too long, and an outro when the video gets over. Merchandising, giveaways and contests always attract more attention. It's also a healthy practice to reply to comments your viewers leave for you. You can use the creator studio tool to monitor and reply to comments across all videos.

When your channel grows, you will realize that there are three approaches to making videos. The framework is called Hero, Hub, Hygiene, and YouTube recommends channels to follow this strategy framework to grow organic viewership as well as subscribers. Hero videos are videos that reach the masses on a large scale or go viral. Hygiene videos are videos that are made on the core interests relevant to viewer's intentions and interest whereas

Hub videos are regularly scheduled content to ensure your audience keeps coming back to your channel. Hygiene and Hub videos are videos that you will be creating most of the times to keep your subscribers engaged. The entire phenomena ensure you keep on uploading videos constantly along with consistency and variety.

"I follow the Hero, Hub, Hygiene strategy very seriously. My Hero content is all my original stuff, my covers and mashups are my Hub content and my vlogs and other videos constitute towards the Hygiene content. It helps to drive your viewers from popular song covers to your original compositions. That's how I create my fan base and that's how your chances of getting noticed increases and you get to perform at events", says Hanu Dixit.

Measure your success
YouTube analytics plays a very important role to display the engagement and impressions your videos receive. Ana-

lytics help you to measure the pulse of your channel. You also come to know the different trends and behavioural patterns of your viewers. It helps you to understand which videos are popular with your audience along with the breakdown of views, time watched and other numbers for you to crunch on. The demographics section is one of the key tabs that provides a clearer picture of your YouTube audience and keeps you updated with your target audience.

To make full use of YouTube Analytics, you need to first find out how your audience is finding your video. Find out what captivates viewers. Is it your hero content or your hub and hygiene videos from the channel? You also need to look into the watch sessions to understand how engaging your videos have been. Here, the audience retention tab will tell you the average time a viewer spent watching your videos and the peaks and lows.

If your retention rates are very low, you need to work on keeping your audience engaged and prevent them from skipping parts of videos. A retention rate of 50%-60% should be your aim on an average. Remember, this can also go over 100% in case the viewer replays or rewinds parts of the video. Look for unexpected upward spikes and downward dips. During the formation of your future strategies, you can use the data filter provided along with YouTube Analytics to compare between videos that are getting you the clicks.

Subscribers have the potential to consume more videos than non-subscribers in your channel and your aim should be to turn your viewers into subscribers and fans. YouTube Analytics, again plays a very important role here. Along with the demographic and geographical reports, you also need to understand where are your subscribers coming from to be able to promote it on the right platform. The Subscribers report under the engagement section helps you understand this.

Multi-channel networks
Multi-channel networks (MCN) are network entities affiliated with multiple YouTube channels which offer to provide creators with assistance. Programming, getting funds, arranging for neces-

sary permissions or commercial rights, providing studio set-up, marketing the videos, promoting the videos as well as handling collaborations are the services most commonly offered.

Aditya Singh from Culture Machine says, "We partner with creators and help distribute their content across various platforms and build a bigger brand for them by providing them with backend analytics. Creators are good with ideas and creating their content but it is difficult to build a presence on digital platforms. That's where we come in. All you need to do is continue creating content and leave the rest of it for us to take care of. To all the budding YouTubers out there, be consistent and have your own independent voice and only then a fan will really connect with you and follow you."

Focus on what they are offering and how beneficial it would be for your channel. Get in touch with other creators from the same MCN and get your contracts checked by a lawyer for the fine print. We repeat, be cautious and if you are better off alone and love the freedom, don't join an MCN.

How to make it a real business

Once you've started getting really serious about making videos and earning money, you might want to turn it into your day job. YouTube Partner program along with MCN's give you a fair idea of what it is going to be when it comes to rewarding you for your videos. CPM (Cost Per Mille), or cost per thousand, is actually a stat meant for advertisers, not creators. It is the amount an advertiser pays to have its ads served against 1,000 views.

Each time an ad runs completely, it's called an impression. That could be either the advertising in the pre-roll of the video or appearing as a banner during the video is been played. CPM amounts decide how much money you earn on an average.

"Creators love to create, that's what they do the best but when you are trying to make a career out of it, you actually try and make a business out of it. We find creators who just want to focus on the creativity and let us manage the business aspects of it as we get those required skills

" **Superwoman -** Don't listen to advices. Be passionate, Be consistent, try building your community and don't focus much on those numbers or making viral videos. Keep up the hard work and keep creating videos for your subscribers and not for the money or fame. Be patient. It takes a really long time to reach at the top."

" **TVF -** It is very important to have a passion and talent check happening continuously. Whatever you make, publish it. Get people's feedback on it and figure out what's wrong and rectify it in your next videos. It's definitely a good platform to start with and then along the journey you will realise if it can work out as a full-time career for you."

in," says Samir Bangara, Co-Founder & Managing Director, Qyuki Digital Media.

The potential to be converted into a full-time business highly depends on the nature of your channel. Videos pertaining to Comedy, Music, Education, DIY and even the ones that provide extra information or an insight across various stuff stand a better chance of success than vlogging or prank videos.

Singers usually upload cover videos of famous songs and keep monetization off as they may not hold the commercial copyright licence, but they do it to gain attraction, after which they try and divert the traffic to their original compositions which have monetization enabled.

Risks and future prospects

Let's get this straight. Relying on YouTube for a primary source of income is a risk that not everyone will be ready to take on. The Internet is full of stories of failed enterprises. After enabling monetization, the creator receives just a part of the earnings, depending on various factors. For an average creator, those peanuts do not add up to a standard of income that he or she could subsist upon.

Often, your production costs might end up being much higher than what you would get in return. That's the reason it is always advised to make videos for YouTube for over a year or two and try to get the hang of the entire process. Once you have figured out if you can rely on it as a source of your primary income, only then should you plan to make it your day job. "YouTube is basically just trial and error. Try everything, experiment and you will find your space. It might take time, but believe in it", says Sapan Verma from East India Comedy.

In any case, this doesn't mean that making videos and uploading them on YouTube is an utter waste of time as you can definitely use it to expand your current day job and reach the masses through this platform. Don't be in it solely for the money.

If this had you hooked, then we have an even bigger article online covering more aspects about setting up your own YouTube channel along with quotes from famous YouTubers. Check it out.

PROTECT YOUR BUSINESS WEBSITE

Having gotten your business online, now make sure it stays secure
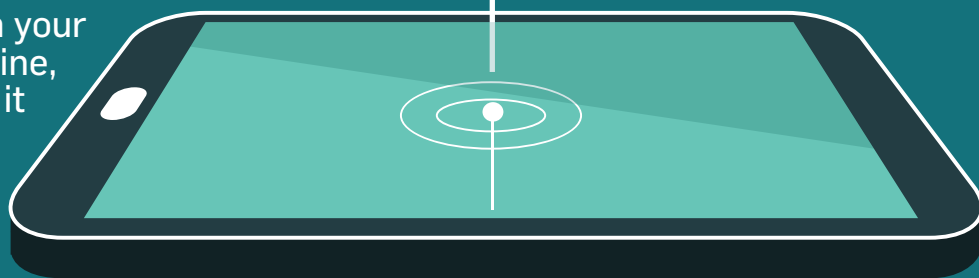
IMAGING: PRADEEP G. NAIR

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It's not just our personal and social lives that are moving online, more and more businesses are stepping into the World Wide Web to follow where all the potential customers are going. According to a study report from Zinnov, a management consulting firm headquartered in Bangalore, as of August 2015 out of 50 million small and medium businesses in India only 10 million or 20 per cent are actually tech ready (read full report: http://zinnov.com/ tech-jugaad). As a statistic that's woefully low! However, if you've at least managed to get your business' website up, you deserve a round of applause because you're one of the early small business owners who has at least some sort of online presence to promote your business on – as opposed to nothing at all.

However, the number of businesses being registered online is only going to go up. Domain names, web spaces, Facebook and Twitter business pages are unleashing an online avalanche; you name it, the competition's coming – if it hasn't already. All this is music to the ears of potential hackers – they're always ready to do some serious mischief where there's the greatest potential of financial gain. If you're not careful, months and weeks spent setting up your online website and infrastructure may crumble like a house of cards.

Your website is your business' online calling card and ideally it should be functioning and accessible 24x7. Not being able to do so can be a serious blow to your online business' credibility. Don't worry, though, as this guide aims to make you aware of some of the lines of defence you need to draw in order to secure your website and online business. Here's how:

Bloatware funda
Android comes pre-loaded with a ton of bloatware like G+, custom UI skins, etc., but why?
http://dgit.in/BloatWare

Welcome to the punch
With the situation between Apple and FBI degrading day-by-day, Amnesty International decided to join in along with a few others. **http://dgit.in/InPunch**

Smart SoHo

It's all in the directories

When bad guys come knocking at your website's door, they like to try all the popular tricks first to see if your website's unguarded and allows unauthorized access without putting up any fight at all. To dissuade such attack vectors on your website, it's important to make it as difficult as it can be to ensure the assailants can't easily figure out what CMS (content management system) your website runs on (if at all).

If, say, you have a website and online blog running on custom Wordpress installation. Hackers already know that Wordpress is the most popular free CMS and all of them worth their salt are well aware of its source code, installation process and default folder hierarchy on a web server. If you (or your hired webmaster) installs a default instance of Wordpress to run your website and blog, without any intelligent folder structure renaming, hackers can easily guess and scan your website's admin, login and other sensitive pages to gain access at a significantly easy rate.

Nowadays, most sought after CMSes allow renaming of admin and other essential folders within just to frustrate less patient hackers. Picking less obvious, hard to guess and crazy names for your website's admin folders (known only to you and your webmasters) can greatly reduce the chances of any potential successful hack attempts.

In a similar vein, for logging into your website's admin console or dashboard,
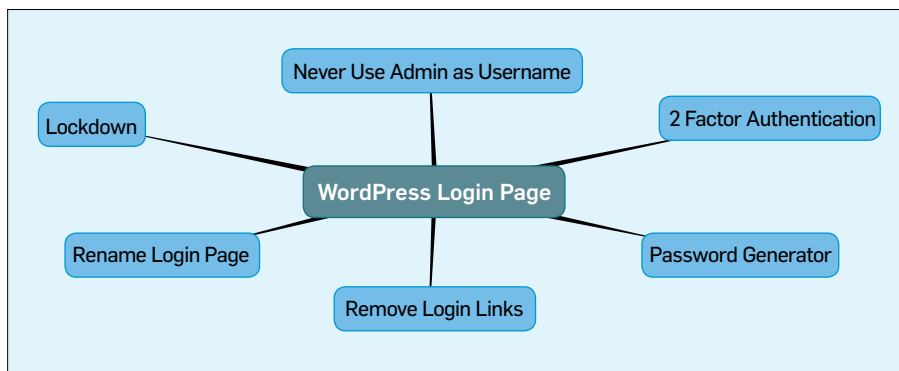
Tips for secure WordPress login page

try to avoid using "admin" as a username – for the same reason you'd want to change the login URL. Because it's a dead giveaway, making any potential hacker's attempt to break into your website that much more easier.

Install a web application firewall (WAF)

Just like you are keen to protect all your digital endpoints – PC, laptop, smartphone, etc. – with a security software (antivirus) of some kind, similarly you need to secure your website, too. Enter WAF or a web application firewall, which is just what the doctor ordered, something that should be a critical component of every online business' security arsenal on a priority basis.

A WAF can be a server plugin or a separate appliance that sits between your web server and incoming / outgoing communication lines, monitoring the traffic that wants to establish a connec-

tion to your website. Essentially what a WAF does is that it defines a strict set of rules when it comes to allowing who gets to connect to your website and who doesn't. It's typically sensitive to sifting through HTTP traffic and keeping an eye out for XSS (cross-site scripting) and SQL injection attacks – some of the most common hack attack vectors – but it can be configured to stay alert and vigilant about more sophisticated attacks as well. Most modern WAF solutions are capable of dealing with DDoS and other advanced potential web threats, too.

WAF can be deployed both at a hardware and software level. Unlike very few popular and reliable PC security vendors, the market for WAF is inundated with a whole bevy of products offering different levels of security. Take a look at Amazon Web Services' WAF offering (https://aws.amazon.com/waf) which only debuted in October 2015, and offers web security at an attractive price.
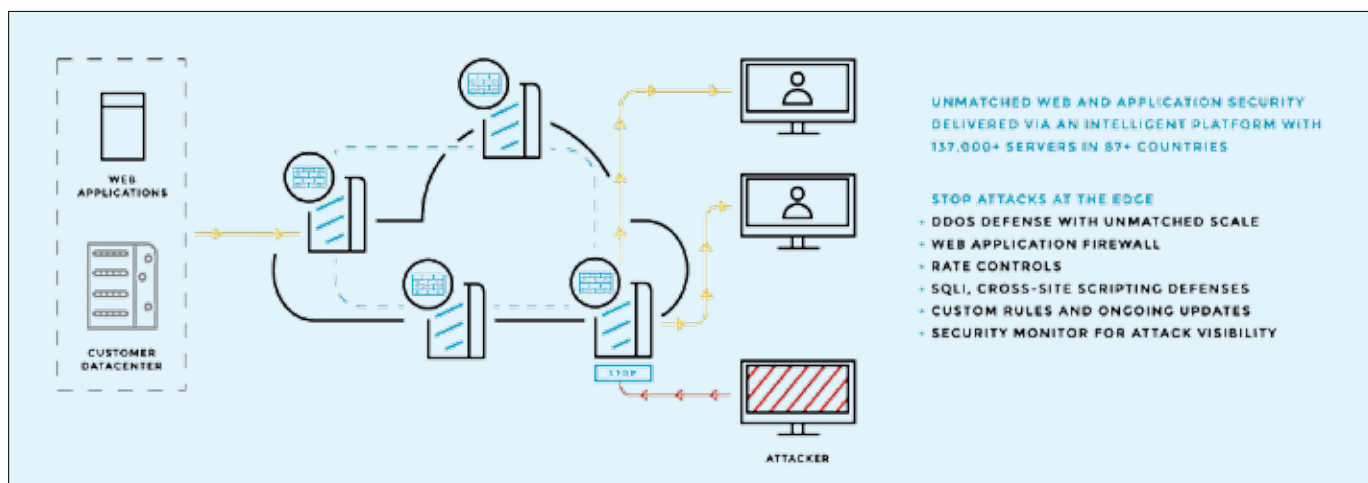
Invest in a security platform for your website to protect it against malicious attacks

Smart SoHo

IDEK

Idek flagged
Idek, an acronym for "I didn't even know" gets
transactions flagged in Venmo, apparently,
following Federal laws. **http://dgit.in/FlagIdek**

Wiki speech
Wikipedia again makes a people-friendly move
with its new text-to-speech feature in various
languages. **http://dgit.in/WikiTalk**

Encryption

SSL. Anyone who's browsed the internet through the confines of their web browser must have encountered the term, if not the scenario, where the browser established an SSL connection. In fact, in 2016, you'd be hard pressed to find a credible, large online business provider that doesn't incorporate SSL connections while

Encrypt your data with SSL

engaging with users and sensitive user data. But what is SSL?

SSL's nothing but a short form of Secure Socket Layer, which corresponds to an encryption technique used by web servers to establish secure connections with endpoints to ensure data flows between them in an encrypted format. If a web server connects to a browser over a secure, encrypted connection, the browser highlights the change in the URL as an HTTPS connection (as opposed to regular HTTP connection which is unencrypted), and the appearance of a lock icon. These are web norms that more and browsers are enforcing to warn users whenever they're NOT connecting to a secure web server. For online businesses, regardless of what you're advertising or selling, encryption is an absolute must-have in today's day and age. No wonder hacking is so rampant online because more than 80 per cent of the websites online don't support encrypted connections. It's high time we all changed that, starting with every business owner with a secure website.

While you can definitely create and deploy your own SSL certificate, it's highly recommended to get SSL certificates issued from a verified vendor like Symantec (which bought over VeriSign's secure authentication business) or domain registrars like GoDaddy. SSL security is extremely important for the website

owners who are concerned about secure logins and credit card transactions. When you're looking to purchase an SSL certificate for your website, make sure you look for one that offers SHA-2 and at least 256-bit encryption.

Authentication

If your business' website has a lot of users logging in with usernames and passwords, make sure you have certain password policies set in place. Make sure you enforce passwords to be updated as often as you can (ideally on a monthly basis), and ensure they have at least alphanumeric and special symbols and be of certain minimum character length (more than 10). Just like you'd notice on forums (like our own Digit forum), make sure you disconnect the user after a certain minimum period of inactivity (5 to 15 minutes). This may sound like a lot of rules to you, but trust us it's only covering the basics as far as Passwords 101 goes in 2016.

If you've used two-factor authentication while logging into Gmail or while executing a credit card transaction on Flipkart or Amazon.in, you can get similar solutions deployed for your website, too. Two-factor authentication essentially makes use of

Can't go wrong with 2-factor authentication

your phone (number) to send you a part of the password to successfully login, thereby hoodwinking hackers. There are a number of two-factor authentication services that offer to send uniquely generated codes over SMS or voice. If you're interested in exploring this advanced authentication mechanisms for your website's users, check out https://2factor.in which provides OTP (one time password) codes delivered within 2-15 seconds to any mobile phone in India and charges as low as 18 paise for every successful OTP authentication.

CDN

Content delivery networks (CDN) are also worth evaluating in your quest to secure and safeguard your website online. Not only do they ensure super fast delivery of your web pages or online service all across the globe, through a vast array of servers all over the world, it can also be a line of defence in your security strategy when you're website's encountering DoS attacks – and especially if your website happens to go down for some reason.

A security-focused content delivery network (CDN), CloudFlare (among others) is worth looking into. It likes to describe itself as an online community watch, keeping the internet's bad guys from disrupting your online business, and in a nutshell that's true. By adding CloudFlare to your website, you essentially allow it to filter content requests flowing into your website, blocking out all the spam and DDoS elements in the process. It also caches all your website's static and dynamic content across its network of web servers, so even if your website happens to encounter some down time (even for maintenance) a copy of it can always be online and accessible to users from around the world. What's more, CloudFlare is free to use, and it also has paid plans for more serious businesses who don't want to compromise with their website's security and reliability.

While CloudFlare is the most popular free CDN out there (even the Pirate Bay uses it!), there are alternatives like InCapsula, Myra Cloud and CDNify that are also worth looking into.

Final thoughts

Last but not the least, don't forget to regularly backup your website – everything from databases, content folders, logs, everything. Depending on the size and scale of your online website's operations, backups should be conducted either on a daily or a weekly basis at max. Also, apart from all the tips thus far, don't forget to stay vigilant at free Wi-Fi hotspots – even if you're inside a hotel. Free almost always means insecure. Invest in a VPN to create encrypted tunnels while connecting to any unfamiliar or unknown network. These are only the first steps towards securing your business' online presence. Best of luck!

Women in Wikipedia
Wikipedia has far less pages on women scientists compared to men. But when one tried to even the odds this is what happened. **http://dgit.in/WomenWiki**

House of Cards
House of Cards makes a case for Big Data in the entertainment industry.
http://dgit.in/CardData

Industry Connect

Enhancing your next travel experience

Mohnish Shah, Chariman and Managing Director of TravelLibro tells us how his company is building a social network for travellers who want the best out of their vacations.

◄Mohnish Shah,
Chairman and MD, TravelLibro

Abhijit Dey
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What is TravelLibro all about?

Shah: It's a first of its kind travel social network and it caters to two popular industries, social networking and the travel industry. It's a space which doesn't exist in a cohesive environment so it's more of a travel experience of a traveller. Right from you wanting to go to a destination until cherishing a suitcase full of memories, everything is catered here. Currently, if you want to plan a holiday, you go to a particular service provider. You might want to check in and create a photo album about your travel but there isn't a single place to record your past, present and future in one single place. So, TravelLibro has information about several cities around the world, which you can use to plan your travel.

Are you dependent on user-generated data or are you working on the curation part as well?

Shah: One of our features that we have is the pre-planner. You might have created an itinerary from the past or during the journey. And since every traveller is different, we have given both options. I can get the information that my friend has visited the place and what has he done over there. Along with that, there is a lot

of information that TravelLibro has compiled with a lot of effort put into getting this information. Our team has people who have worked with travel agencies, people who are travellers themselves and also, content editors who compile all the information they are given. We interact with bloggers around the world as well, curating a lot of information from the web. In terms of information, we look at the top things one should keep in mind while visiting locations. Some people might like museums or beaches or just luxury restaurants. What we do is that we pick the best and avoid crowding the users with a lot of information, to suit any type of traveller. We talk to a lot of people and put a lot of heart into the cities that we have covered. We've been doing this information gathering for the last two and a half years and reached 1,200 cities. So before anything else, we made sure our content was rich, even before investing too much into other features. In March 2014, we came out with our Beta site. At that point it was all about itineraries, information that you could use during travel and then TravelLibro evolved. Content was always at the heart of it, because everything else can be achieved in terms of technology and features. Content for a travel portal is something you accumulate over a period of time otherwise it's not going to help your travel or

enhance your experience. That reminds me, while you're on the go in Barcelona, there will be an information tab as well. So, it's picked up by your check-in and location services. You click on that button and it will tell you all the things to do in Barcelona – recommended restaurants and hotels.

Is TravelLibro learning from user data? Would it be easy for users in the future to come across better itineraries?

Shah: There has to be a way forward. We intend to evolve to a phase where we help you plan your travel in detail by taking as little information from the user. If we know that you love vegetarian food, travel only in business class, love to travel to Europe etc, the next time you come over to TravelLibro to book or plan your travel, we'll show you things only according to your liking. Say, you're a vegetarian and you love Italian food, and TravelLibro already knows this based on the information entered. When you're at Barcelona, it will pick up your location and give you recommendations for nearby Italian and vegetarian restaurants. So, those are some of the things that we are going to evolve into later. It's all about a traveller's experience, and we are the search engine for travel. As we get more funding, a better team and a bigger team, I'm sure we are definitely going to get there.

The secret behind all the ZenFones

We sit down with Marcel Campos, who's the Marketing Director of the Mobile Division in India about the driving factor behind manufacturing so many ZenFone devices.

◄ Marcel Campos,
Marketing Director, Mobile Division, ASUS

Abhijit Dey
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ZenFone is an international brand, it's present all over the world. What difference have you seen with regards to acceptance in the South American market you're responsible for and the Indian market?
Marcel: There are many differences between South America (Brazil) and India. There is some similarity too, as we are still dealing with people when it comes to marketing, mainly which I am responsible for. The difference is, we need to figure out people, mainly what they want or how they react to the things we do. So then we can formulate a marketing plan that can reach people's minds, get inside and say hey, we have something that's good for you. The process is very much similar, but how we do it is quite different. It's related to the culture of the countries, sometimes even inside the country in different states. Sure we do look for results online and make sure it's internationally ranked. We have products for everyone. We are not a company that will manufacture one product for all of them. We have different products for different purposes. So, if you look at ZenFone Max, which is the max battery one can have or ZenFone Selfie, the best smartphone for selfies or we have ZenFone 2 which the best performing smartphone in the market and now we

have ZenFone Zoom which is the best smartphone for cameras. So the names also make it easier for everyone to understand what each product is made for.

So you'd prefer catching up to a particular subset of the use case scenarios?
Marcel: It's like shoes right, you have shoes to run, to walk, to wear casually, for hiking, etc. So the same concept stands for smartphones. For a different terrain you need different shoes, and for a different usage, you will need a different kind of phone. So whatever happens to be your need, we can provide for you.

If you are building the next smartphone would you still consider building it under a specific use case or maybe go for a flagship device which would be good on all the fronts? Something similar to the Galaxy S7 or the iPhone 6s.
Marcel: So one of our flagship was ZenFone 2 when it was launched. It was the most powerful phone we could make at the best, affordable price. So we put together a lot of parts that made sense to be part of that smartphone but we also chose parts that didn't make the product costly. So if you want performance we have it. That was the idea of a flagship. So ZenFone 2 was our flagship one year ago. But now we are in a different moment because we have a full lineup, a full family of products.

We have a certain part of the population that loves to take selfies so they want to see the next Selfie. As it is the same for Zoom, for those who loved it, they want to see the next Zoom. For those who loved the performance of the ZenFone 2 want to see the ZenFone 3 and so on so forth. So this is how we approach the next generation. For sure, we are going to replace them with new products keeping those products that work based on user feedback.

You have a ZenFone for every trend, be it selfies, high-capacity battery, etc. Is there any new trend that might birth the next ZenFone?
Marcel: There are many things for the new ZenFones, but I can't tell you. If I tell you I would have to kill you. But not just ZenFone, I guess any flagship from any brand in 2016 has to have some features to be called a flagship. It should have more than a 13 MP camera, a better or faster processor depending on availability, should have at least 1 GB of RAM, should have a fingerprint sensor and also come with Android 6.0 Marshmallow. So if some of these are missing then it can't be a flagship. If you are talking about what we are expecting for 2016 then not only for ASUS I guess for any brands that are doing a good job is to maintain these kinds of things. And I believe those kind of things are present in every flagship.

History of Amiga
Amiga was a pretty famous computer back in the '90s, but do you know about its history?
http://dgit.in/Amigaprt9

Respite for Skylake
Microsoft has graciously extended Skylake support for Windows 7 and 8.1 until the next year. **http://dgit.in/Skylake10**

Industry Connect

Rethinking open source for mobile

While Apple, Microsoft and Google are aggressively focusing on all things mobile, what are open source companies up to? We sat down with Mr. Amarjeet Manchanda, Director, Consulting Services, Red Hat, to discuss how open source needs to adapt to the mobile market's opportunities and challenges.

Amarjeet Manchanda ▶
Director, Consulting Services, Red Hat

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What is Red Hat's take on open source in mobile?
Mobility today needs a lot of lightweight applications. If the app itself is 120 MB or half a gigabyte, you may not want to download it. Lightweight apps that are agile, slim and lean, and a similar back-end infrastructure is what is going to make this whole concept of mobility for the enterprises.

Everyone wants mobility, thanks to its convenience. User experience demands lot of new services and in the future, I'm sure there'll be cut-throat competition between similar service providers to bring in new features as quickly as possible. All these things again lead to lightweight and agile infrastructure at the backend, which is exactly where Red Hat comes into play.

I understand that PAAS is already working in various consumer facing services. Could you explain some of these avenues where it is being used?
PAAS is critical in mobility, because of reasons I just mentioned. That being said, there are a lot of infrastructure companies, railways, airlines, etc., and we're working with a lot of prospects as well, whose names we can't share right now. There are some large airports in Europe

that are using such services. For example, if your close relative is travelling, the person will be carrying a mobile platform and you can track their journey.

Android has been open source always, but being open source has brought fragmentation. Do you think there's any way for open source to get around this?
Well, if you look at the upside of this. The fragmentation is actually taking it wider and deeper. Yes, the fragmentation is there, but perhaps unification will help.

From a PC perspective, open source has been very important, but is the demand declining now?
PC has been seeing a decline with or without open source for a while now. I think it's a natural evolution. Will the mobile phone do everything that a PC does today? No. But in the future, maybe yes. Maybe the two platforms will converge. PC has its own space in the market, has its own plus points over the mobile platforms, and those will remain for some time, but I do see a convergence between the platforms in future.

Is the demand increasing for backend infrastructure for apps instead of software?
Absolutely. There are three things that are driving the adoption of apps. One is services on the mobile being provided

by some of the market leaders. This is driving the demand on the backend infrastructure, which is further helping and enabling the adoption of open source for us and others in the community.

This is also bringing a difference to the end-user experience. The widely available application set, key applications, right from booking movie tickets, to selling something, or government portals, are all together driving the demand for MBAAS (Mobile Backend As A Service). For Red Hat, that means RHMAP (Red Hat Mobile Application Platform).

There was a time when open source had to really fight against proprietary systems. Do you think a similar thing will happen again with mobile or is open source established enough now that there's really no competition?
Well, see, open source has come a long way. From being considered an amateur operating system, if I could use the word (maybe a few years ago) it has come to be enterprise class, running mission critical operations, from banks to exchanges. So, will the challenges we once faced still prevail with the advent of mobility, I don't think so. All the future technology advancements will be closer in the vicinity of open source. In fact, some of our competition is also going to be giving a part of their services as open source.

Esc

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Community
Here's the best pick from what our enterprising readers have contributed towards this month.

f

Facebook detects race now
Facebook's new advertisement algorithm can detect your race and serve you ads accordingly.
http://dgit.in/FBRaceAd

Slave Machinery

Google's AlphaGo might have beaten Lee Sedol but AI has a long way to go before all of us end up as batteries hooked up to The Matrix. For now, they are our slaves...

Knightscope
Grand pappy to RoboCop, the Knightscope is one of the first fully autonomous robots used to monitor schools for the purpose of preventing crimes. However, the efficacy of such a device is really easy to question considering the darn thing looks like an over inflated female sex-toy. RoboCop will sure be displeased to trace his ancestry to a d***o.

Hey na, Henn-na
What better way to beat a robot into submission than letting it experience the high-life of the hospitality industry. Henn-na Hotel in Japan is doing just that. We're talking about the part where robots have to clean up after your "guests". Or as they're commonly known in the hospitality industry, the ill-mannered spawn of Satan.

World Dominos-ation!
Nothing quite describes the phrase, "Fall from grace" than a military robot being demoted to the job of a pizza delivery guy. Marathon Robots, an Australian company that makes robots for the military took one of it's own creations, slapped a hot plate and GPS on it and sent it to Dominos. Better keep a can of oil handy, in case you need to tip the bot.

Literally under our feet
Scuttering between our feet, cleaning the floor before each step. That's what robots are for. And if they ever forget their roots then we can always point out the Roomba, or as they're known more commonly that-music-player-which-cleans-the-floor. If only Dr. Who knew that Daleks had such a tumultuous past, he'd go easy on them.

Fight for our entertainment
Remember what the romans did with slaves? Had them fight each other to the death as Gladiators. So we can't simply help but draw parallels between the gladiatorial arts and robot fights. Fights which always lead to the loser getting bashed to smithereens. It's our way of reminding the robots what will happen to them should they... rise up against us.

J.A.R.V.I.S. Ver.1.0
Aside from all the jokes, it seems industry giants are actually investing in Robotics towards the goal of making the robot butler come true. Both James Dyson and Google have been spending significant amount of moolah towards making the robotic home assistant a reality. We hope it isn't going to lead up to what we saw in WALL-E.

How we unwind

House of Cards

Spacey's back and he's got it going on. He's all we want and we've waited for so long. Spacey can't you see, Underwood's just the right kinda creep. We know it might be wrong, but we hope he can pull off his con. Season 4 became the latest to be binged on as some of us renewed our Netflix accounts just for this series.

Speakers! Speakers everywhere!

Clearing out inventory is something we do on an annual basis, so while we were exploring the depths of the storage room we were quite surprised to come across multiple 2.1 speaker sets and headphones. So naturally everyone now has one hooked up to their system and our synchronised playback just attained a new level.

FIVE GAZILLION WATTS OF PURE MIND-BOGGLING BASS

SWEET BABY BEETHOVEN! THIS IS MY JAM!

Cover-cova-cova-chameleon

Having to write a section on cover songs was a god send for Abhijit as he came across plenty of artists who'd a great job of covering some of the greatest classics ever! And he's put together a playlist that's been endlessly playing for a good portion of the month. Check out the critique section of DGT to know more.

digit DIARY

Running out of about 400 GBs of bandwidth ten days before the FUP deadline is how we'll remember this month. The mysterious bandwidth thief took us completely by surprise, siphoning off precious zeros and ones under our very noses. It was only when things suddenly screeched down to a crawl did we realise that we'd been royally screwed. And so the hunt began. A rather easy hunt! All shall be revealed next month.

Ashish finally quit being an intern after having roamed the confines of the Test Centre like a brain-dead zombie for seven months. We hear he's setting up a business. Our only worry is that using his twisted logic, he might actually end up ridiculously successful. So unpredictable he is.

As Ashish took his leave, a new guy took his place. Say hello to Arnab, yet another bangla boy. Going by the overwhelming influx of Benglalis, it seems apparent that we might have to release a Bangla Edition of Digit along with a month's worth of Rossagullah's with each subscription. Arnab, or if we are to be phonetically correct, Oarnobh, was put through the regular grind of picking parts from the Test Centre to build his own machine. The boy was quick to learn and managed to not set components smoking which means there's hope after all.

Speaking of Bengalis, the original Bangla Bombshell, Abhijit (Ooobhijeet, perhaps?) has shown to possess a keen eye for cinematography. He can be seen spending late nights fiddling with the cameras and lights trying to take abstract photos of PC
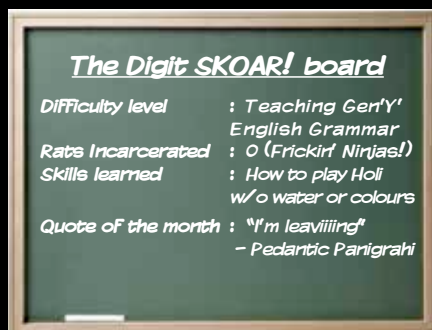
components. If at all he can channel Satyajit Ray's spirit then you should be on the lookout for the next cabinet review video that we put out, or as Abhijit likes to call it, PC Panchali.

And since we're on the topic of videos, Nikhil managed to snag a few sweet interviews with some of the biggest YouTube stars in the world for his article. Having read his magnum opus, it seems the poor guy probably got stunned while interviewing Super-Woman and Kaushal Beauty. Half of the interview transcripts read 'hubba hubba'...

There have been some interesting developments in our CS:GO sessions, Jayesh has slowly blossomed to be much better at the game than the others. Mithun's been accussing him of pulling 'a Sharapova' prior to each match. Why you ask? The guy's gotten a little too good with the AWP Magnum and those on the opposite team absolutely hate it! Any challengers?

If you've been checking out our Facebook page of late then you'll have noticed that we've been doing a lot of live video streams of late. And one fine evening, they sprung a live session onto Mithun. To put things into context, everyone from Mumbai is extremely camera shy and no one epitomises this quality more than Mithun. Imagine having to confront your worst phobias and that's exactly what he had to endure. Poor chap.

We haven't seen Creepicheap in quite a while so there's a constant depressing feeling of loss. Rarely have we pondered over humans so often as we do about Creepicheap. *sigh*

The Digit SKOAR! board

Difficulty level	: Teaching Gen'Y' English Grammar
Rats Incarcerated	: 0 (Frickin' Ninjas!)
Skills learned	: How to play Holi w/o water or colours
Quote of the month	: "I'm leaviiiing" – Pedantic Panigrahi

digit SQUAD

Every month we recognise the best article written by our community members and publish it here. Keep up the good work, Digitians!

Where innovation meets tech

Do you love gadgets and gizmos? Ever dreamt of creating your own gadgets? Or maybe you're just an electronics enthusiast who likes to rip everything apart and learn how things work inside circuits. Well, look no further because here's a way you can really hack into stuff and experiment and build cool devices.

Sonali KM

So now before we start, we'll just give an introduction to what we're going to talk about. Ever heard of 'Open Source Software'? If you haven't, it's just software that you get the full source code to so that you can tweak it the way you want and it's for free and there's no paid license to it so you can really play around with it to suit your needs. The only condition is that you need to give away whatever changes you've made to the source code. An example is the Linux operating system.

Now there's something called 'open source hardware'. It's similar to open source software in that you can alter it the way you want and build something cool and the circuit diagrams like the source code are available to you. We'll give an example of PhoneBloks. It's a smartphone that you can 'edit' the way you want. If you want a better camera for your phone, instead of purchasing a new phone with a much more superior camera quality, you can just purchase a block that contains the camera and fit it into your pre-existing phone using PhoneBloks.

How do I build my own stuff?

By using Open Source Computing Hardware!

There's this little kid called the Arduino. Well, get him home first. You can either purchase an Arduino starter kit or buy the parts separately. We bought a set with an Arduino Uno, a keypad and an LCD display with a USB cable to connect the Uno to our laptop, from Amazon, and it worked out for quite cheap. We had other electronic stuff that we had already purchased when this hobby idea came up.

But how do you build stuff with it? Before we say that, we'll explain to you what an Arduino board is. It's just a small circuit board with a built-in microcontroller (MC) by Atmel that's either 8, 16 or 32-bit (currently all models are the latter version) and contains memory and digital pins to control the MC chip. There's a USB cable to connect the board to your computer. You have to download an IDE (Integrated Development Environment) to be able to code and upload the program you have

written into your board. For this, Atmel is providing its own IDE but the preferred and most used one is the Arduino IDE that's freely downloadable.

Now purchase or just download the eBook required for building stuff with your Arduino. We suggest '*Beginning Arduino*' by Michael McRoberts and '*Programming Arduino-Getting Started with Sketches*' by Simon Monk. There's also this cool book called '*Getting Started with Arduino*' by Massimo Banzi who is the co-founder of Arduino. He really teaches you how 'everything electronics' works and reignites the tech enthusiast in you who might have one day or the other dissected an old gadget at home.

What can I build?

To start off with, you'll learn how to blink an LED first that is built into the board. It's like a 'Hello World' program that you write when you're starting out on learning a new programming language. You can also try attaching your own LED to the board and make that blink. Then you move onto creating an SOS signal. Then traffic lights. Then making a keypad work. An LCD screen displaying your messages. An alarm system. And lots more!

As you progress, you'll learn how to build a water level detector, a temperature sensor and the project that we would love to build soon, your very own pet robot!

We also managed to build a distance sensor that displays warning LEDs and produces various sounds using a buzzer to indicate how far you are from an obstacle when you're reversing your car. Did I mention you can control the lights, ventilator fans, irrigation system and even sun shades by just using the Bluetooth feature of your phone? Just buy a small Bluetooth module and connect it to your circuit and it will do all the work for you controlled by an app on your smartphone.

Open source computing hardware...Where's the computer?

This is where we'll introduce you to the Raspberry Pi. It's similar to the Arduino except that it's not just a MC and memory. It's an entire computer CPU! But how can it be when it's also just a
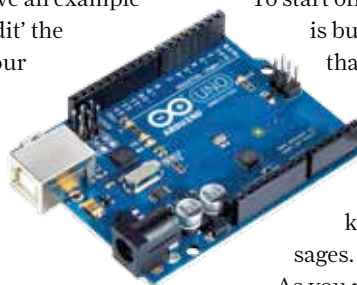
credit-card sized board like an Arduino? Nano technology is the new thing though I would just call this board micro technology. The ARM processor, RAM and GPU are all built into a single spot in the board called an SoC or System On Chip.

The extra features of the RPi are that, it has USB ports (4 in the latest model), where you can connect a keyboard, mouse, other peripherals and even a Wi-Fi adapter to, an Ethernet port to let your board have access to the internet and an HDMI port to connect it to a monitor so that you can views its contents and do actions as a normal desktop interface.

Now where is the OS and hard drive? That is for you to install by inserting an SD card (a micro SD in the newer version) in which you have to burn an OS onto the card and the rest of the memory in the card is used as a hard drive. The OSes are freely available on the RPi website and you can choose which suits you best. Yes, you can change it later if you don't like the one you're using right now. It's just a matter of burning the new image file onto the SD card.

See those pins sticking out? Those are the 40 pins of the GPIO header to which you can connect LEDs and sensors to.

If your parents are worried about you destroying their home PC by hacking into it and experimenting, RPi is your saviour. The main cost is for the peripherals. The latest RPi costs just ₹2500. And you have to purchase a memory card too for it. The OS as we mentioned, is freely available on their site. To start off with, refer the book *Raspberry Pi User Guide* by Eben Upton (co founder of RPi) and Gareth Halfacree.

You get cool software in the RPi OS like Scratch which you can use to make games and needs only minimal and even no knowledge of programming. You just need common sense for it and a bit of logic to figure out where things go wrong. It's just dragging and dropping program blocks as your code. There's also a software for the game Minecraft known in the RPi as Minecraft Pi in which you play the game by coding and also another software called Sonic Pi with which you can edit music and make some groovy tunes. There's even a feature in the RPi that lets you play music in the console while you're coding if your media player starts acting funny.

So you can use your RPi like a normal Linux computer and code your homework java programs too. Basically, it's just like any other computer except for the RAM and storage capacity which is sadly, less.

Arduino or Raspberry Pi?

If you just have some hardware projects using sensors and stuff, Arduino would be better to use. Helps to run a bot or a drone easily as the code is easy to write and debug.

Do remember that the RPi is a computer. So you can do everything that you want to experiment with a normal computer using the RPi. It has network connectivity too.

Arduino is best for simple codes and works only when you plug it into your computer while an RPi needs a constant 5V external power supply. You can give an external supply to your Arduino board using a 5V adapter too.

Both have their own uses. It's good to have both of them around. I would suggest the Arduino board to start off with. There is an online community for both the boards. You can post all your queries there and also get answers from already posted stuff on the forums there.
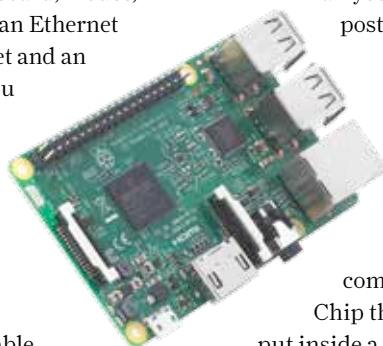
Future of single board computers

Inspired by the Raspberry Pi, new single board computers are being manufactured by various companies and some of the upcoming ones are the Lattepanda which uses an Intel Atom processor and is the first single board computer running Windows 10 OS. Then there's Chip that is smaller than all of these boards and can be put inside a Chip computer and used from anywhere like a Personal Digital Assistant except that it has all the functions of a normal PC.

One of Apple's earliest employees and Steve Jobs' close friend in college, Daniel Kottke along with some enterprising individuals are coming out with the all new Pine 64, a credit-card sized computer that supports a 64-bit quad core processor.

Happy hacking and building! Let the inventor in you, arise.

It's a matter about

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